ARCHITECTURE: NOTES AND EXAMPLES.

Introduction.

In this section it is proposed to deal with the artistic part of Building Construction, and the notes and examples given are classified so as to extend—as far as possible chronologically—from the earliest times to the present day. In many cases the notes take the form of model solutions to examination questions.

Short Sketch of Greek Architecture.

Greek architecture may be divided into three periods: its archaic state, its perfected condition, and its decadence. The first period owes its development to the earliest settlers in Greece, who were in course of time displaced by other migrations from the East. The first period, the archaic, dates from the twelfth century B.C. The second period, from 450 B.C. to 300 B.C., is the great temple-building period in Greece and also some of her colonies, as Sicily and the Archipelago. During the last-mentioned period some of the finest works of Greek art, sculpture, and painting were executed. After this period there was a long lapse, and then Greece came under the domination of the Romans. The Romans built other temples in the conquered lands, but they transported her chief treasures to Rome. The period of decadence then seemed to begin. The earliest example of a temple of the archaic order is the Doric Temple of Corinth, of which only a few columns remain. It is supposed that the Egyptian temple formed the model from which all other structures borrowed their leading features. The Egyptian temples were enclosed with lofty walls, but the Greek temple was to be seen from all sides, and appeared isolated. To give the front of the temple a better appearance, or to afford protection to the paintings, by prolonging the side walls and providing two columns to carry the entablature, a porch would be formed. This gave the temple a bold appearance, and many temples were found to be built in this way. Sometimes four to six columns would be placed on the front, while occasionally a temple with columns all round it would be found. The temple was placed on a base consisting of three steps, varying, according to the size of the temple, from 6 in. to 18 in. or more. The plans of these temples were of the simplest and most elementary character. The roof was constructed of timber, with a covering of Parian marble, in imitation of tiles. The columns taper upwards with a slight curve instead of being straight.

Four Periods of Greek Architecture.

First Period.—Cyclopean, Early Doric, and Ionic, 1184 B.C. to time of Solon. Examples: Ruins in Greece, Italy, Sardinia; treasure house of Atreus at Mycenæ; temple at Corinth; temples of Here and Olympia at Samos.

Second Period.—Extends from 600 B.C. to the time of Pericles, who died B.C. 429. Examples: Temples of Olympic Zeus at Athens and Apollos at Delphi, both Doric; Temple of Diana at Ephesus, Ionic; temples at Syracuse, Selinus, Agrigentum, and Egesta, all in Sicily; Temple at Pæstum, 500 B.C.; Temple of Minerva at Egina, 479 B.C., all Dorian, no Ionic building of this period having existed till the present day.

Third Period.—Extends from the time of Pericles to that of Alexander the Great (died B.C. 323). Examples: Temple of Pallas Athene, or the Parthenon, on the Acropolis, and the gate called Propylæa, both at Athens; temples at Eleusis, Rhamnos, Senion, and Thorikos (mostly Doric); the triple temple of Erechtheum (in the Ionic style); Temple of Apollo at Bassæ in Arcadia (Doric, Ionic, and Corinthian styles all introduced); Temple of Minerva Alea at Tagea (Doric, Ionic, and Corinthian), of which Scopas the Athenian was architect; choragic monument of Lysicrates at Athens.

Fourth Period.—Extends from the period of Alexander the Great to 150 A.D. Examples: Temple of Apollo Didymæus at Miletus, Temple of Jupiter Stator at Rome, theatre at Jassus.

Cyclopean Architecture.

The earliest examples of Grecian architecture are the remains of the circular walls round towns and palaces known as Cyclopean. They consist of huge masses of stone put together without mortar, and may be divided into three varieties: (1) Enormous unhewn boulders in their natural shape laid one on another, and the interstices filled up with smaller stones. (2) Gigantic polygonal blocks

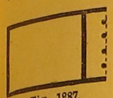


Fig. 1887.

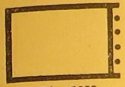


Fig. 1888.

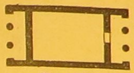


Fig. 1889.

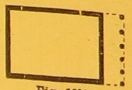


Fig. 1890.

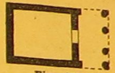


Fig. 1891.

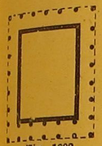


Fig. 1892.

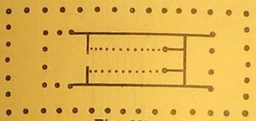


Fig. 1893.

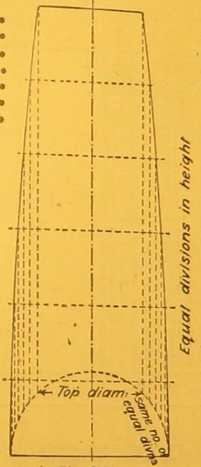


Fig. 1894.

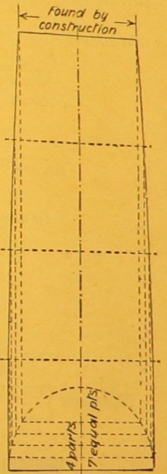


Fig. 1895.

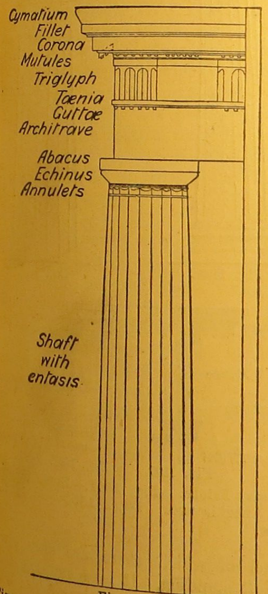


Fig. 1896.

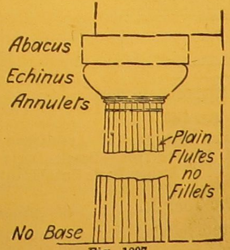


Fig. 1897.

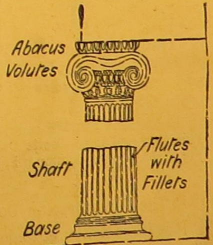


Fig. 1898.

Figs. 1887 to 1889.—Plans of Temple "in Antis." Figs. 1890 and 1891.—Prostyle.—Figs. 1892 and 1893.—Pseudo-dipteral. Figs. 1894 and 1895.—Entasis. Figs. 1896 to 1898.—Distinguishing Features of Columns.

of stone, the corners of which fit accurately into one another. (3) Large regular blocks of equal height, approximately squared, and forming what we should now call heavy ashlar work.

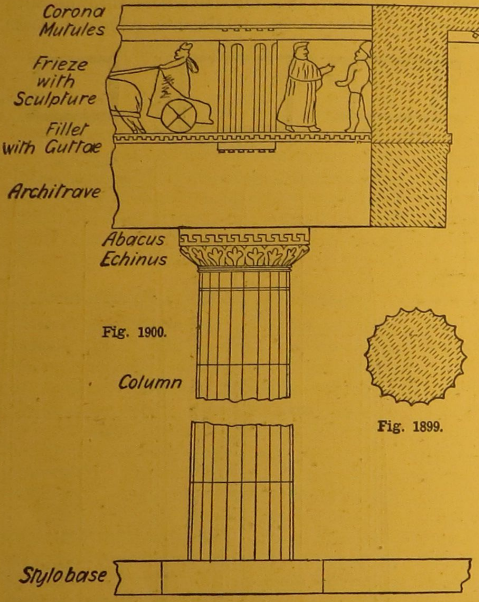


Fig. 1900.

Fig. 1899.

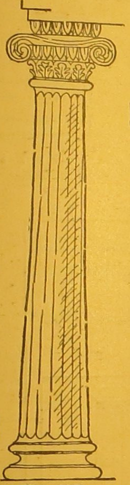


Fig. 1902.

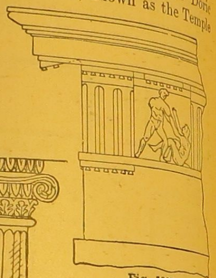


Fig. 1903.

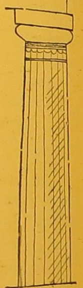


Fig. 1901.

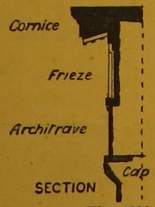


Fig. 1904.

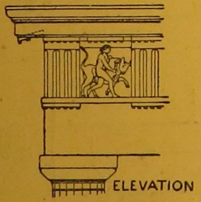


Fig. 1905.

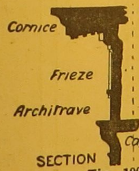


Fig. 1906.

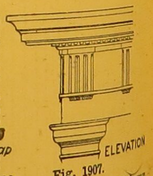


Fig. 1907.

Figs. 1899 and 1900.—Doric Column with Part of Architrave and Frieze. Fig. 1901.—Doric Column. Fig. 1902.—Ionic Column. Figs. 1903 to 1905.—Greek Doric Entablature. Figs. 1906 and 1907.—Roman Doric Entablature.

The First Grecian Doric Temple.

It is still a matter of conjecture in what city the first Grecian Doric temple was erected; but Vitruvius states that Dorus, the son of Helen, reigned over Achaia and Peloponnesus, and that he built a temple of the Doric order on a spot sacred to Juno in the ancient city of Argos, 1,200 years B.C. The most ancient existing specimen of a temple of the Doric order is that at Corinth, known as the Temple of Athene, of which there are only seven columns left standing. It is a simple, plain, bold design of massive proportions. The date of building is about 650 B.C. The Ionic temple of Fortuna Virilis, now existing as the Church of Santa Maria Egiziaca, is one of the few Ionic buildings in Rome. It is tetrastyle, with half-columns all round it, or "pseudo-peripteral," as Vitruvius termed it; date about 140 B.C. The Temple of Concord in Rome is another specimen of Ionic design.

The Planning of Temples.—The arrangement of the columns gives the key to the planning. "In antis" is the term applied to a temple where the side walls are continued beyond the front wall and the columns placed between as Fig. 1887, or where the front is terminated by antæ or pilasters and the columns are placed between, as in Figs. 1888 and 1889. "Prostyle" is the next step in the arrangement of the columns, and consists in advancing the pediment in front of the main building, the pediment and entablature being carried on a row of columns open at the ends, as in Fig. 1890; or when the columns are advanced in front of the antæ, as Fig. 1891. "Pseudo-dipteral" is as if dipteral or with double row of columns on each flank, whereas there is only a single row of columns on each flank, giving more space within the colonnades than the dipteral. There is a double row of columns in front, and the others are placed the same distance from the cella as the outer row, and therefore give a pseudo or false appearance, as Figs. 1892 and 1893. "Hypæthral" is applied to those temples having the cella or naos partially or wholly open to the sky.

Entasis of a Column.

The entasis of a column is the swelling of the diameter beyond the outline which would be formed by a straight taper. "Some authorities make it consist in preserving the cylinder of a column perfect for one-quarter or one-third the height of the shaft from below, diminishing thence in a right line to the top; while others, following Vitruvius, make the column increase in bulk in a curved line from the base to three-sevenths of its height, and then diminish in the same manner for the remaining four-sevenths, thus making the greater diameter near the middle." According to another account, "the shaft diminishes in a slightly curved line from the base, or inferior diameter, upwards to the hypotrachelium, leaving it at that place from two-thirds to four-fifths of the diameter at base." Tredgold's outline of the entasis was obtained by setting off the height and the top and bottom diameter of the column, describing a semicircle on the bottom and dividing the portion on each side that extended beyond the top diameter into any number of equal parts, then dividing the height into the same number of equal parts, and projecting vertical lines from the divisions on the semicircle to cut those in the height at points in the curve, as in Fig. 1894. Another modification was to divide the centre line of the semicircle into seven equal parts, making the top diameter the same dimension as the third line down, projecting vertical lines from the other divisions as before (see Fig. 1895). The swelling of the column makes it look as if actually supporting the load on top and swelling under the pressure as wrought iron does in compression. It also prevents the sides of the shaft from looking hollow. The taper increases the effect of height by the appearance of diminished size due to distance, and a larger diameter at the bottom is scientifically accurate to compensate for the weight of the column itself.

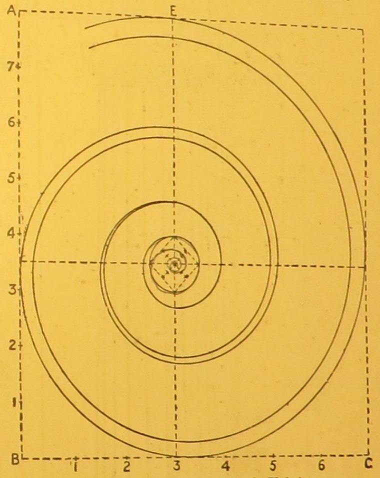


Fig. 1908.—Setting out Ionic Volute.

Grecian Doric Columns and Entablature.

Entablature in Greek and Roman architecture is the name given to the whole of the parts of an order above the column. It is sub-

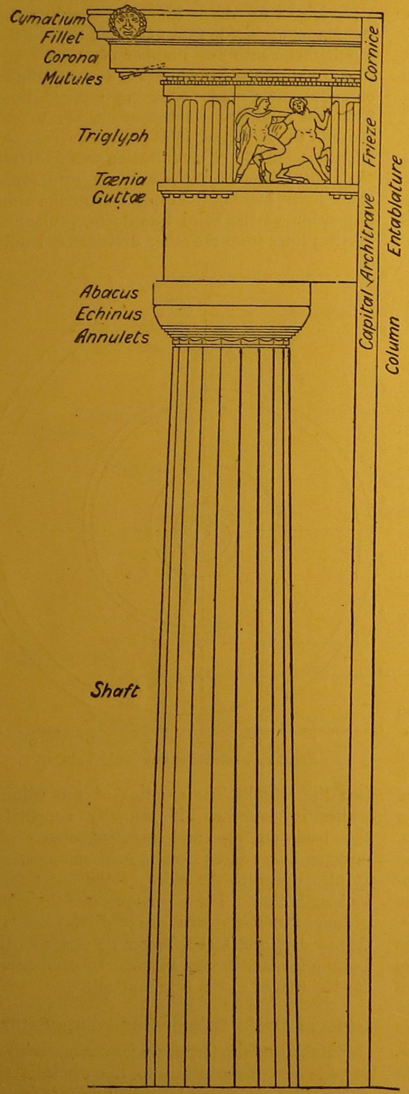


Fig. 1909.—Doric Order.

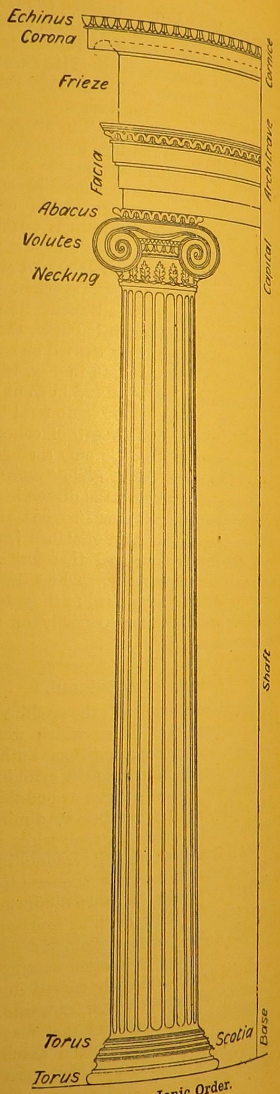


Fig. 1910.—Ionic Order.

divided into three parts, the architrave resting immediately on the column, the frieze or flat surface separating the architrave from the cornice which forms the outer group. According to Gwilt, the proportions of the columns and entablature of the Greek Doric order in modules and minutes (a module being the semi-diameter of column at base, and a minute the thirtieth of a module) are as follows:—

Height of column = 16 modules = 8 diameters.

$$\text{Height of entablature}\left\{\begin{array}{l}\text{architrave, 30 min.}\\ \text{frieze, 45 min.}\\ \text{cornice, 45 min.}\end{array}\right\} = 4 \text{ modules}$$

According to other authorities, the column is from 8 to 12 modules high, the capital and necking occupying two of these; and the entablature 3½ to 4 modules high, of which architrave occupies two-fifths, frieze two-fifths, and cornice one-fifth (Figs. 1896 to 1898). The diameter of a Doric column being taken as 4 ft., Figs. 1899 and 1900 represent section and elevation, the latter showing Greek treatment of architrave and frieze. The distinctive features of Doric columns are:—Plain square abacus, saucer capital or quirked ovolo, neckings or grooves at top of shaft, twenty flat flutes worked to sharp arris. No base. Column 5 to 6½ diameters long (see Fig. 1901). The distinctive features of Ionic columns are:—Small ornamented abacus. Capital with large volutes at sides or angles, with egg-and-dart moulding, torus moulding separating shaft from capital, twenty-four semicircular flutes with fillet between; base consisting of two torus mouldings separated by scotia and two fillets. Column 7½ to 9 diameters long (see Fig. 1902). Special features of the Doric entablature are:—(1) Architrave quite plain, simple flat surface. (2) Frieze ornamented by triglyph and square sculptured metopes between, with mutules above both, and guttæ below triglyphs. (3) Projecting cornice of shallow depth, with mutules on under side. For Greek Doric entablature, see Figs. 1903 to 1905, the latter being from the Parthenon. For Roman Doric, from the Theatre of Marcellus, see Figs. 1906 and 1907. Figs. 1901 and 1902 are only rough memory sketches.

Greek Temples Outside Greece.

At Agrigentum, the Doric temple of Juno Lucina, the Doric temple of Concord, the temple of Peace, the temple of Jupiter: at

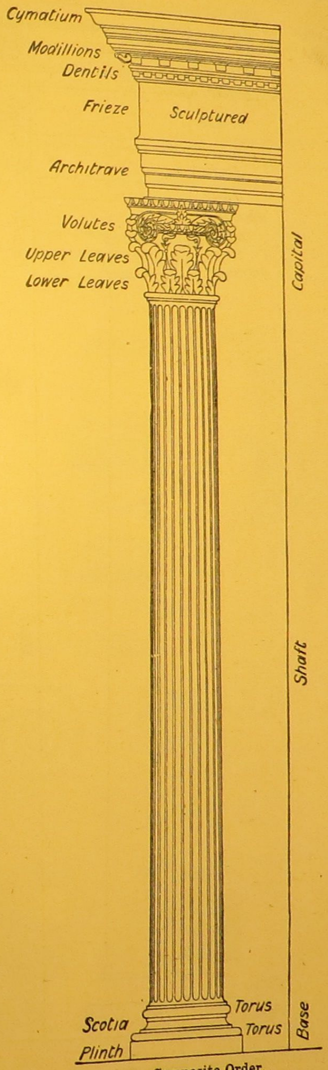


Fig. 1911.—Composite Order.

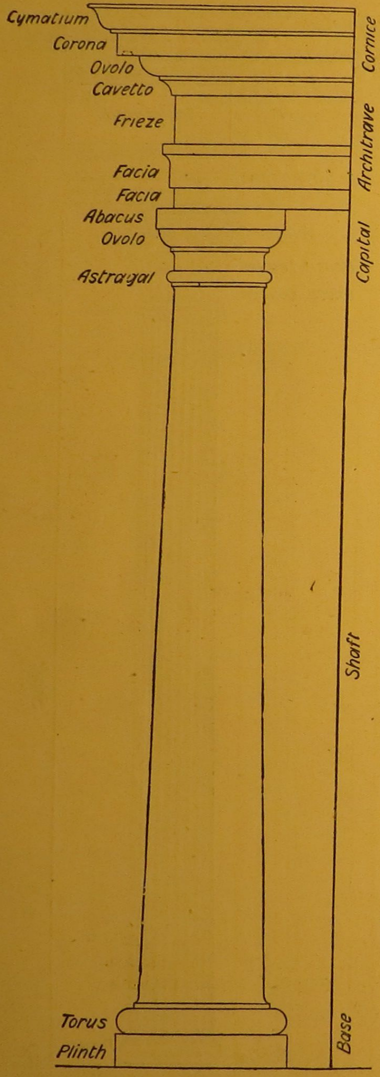


Fig. 1912.—Tuscan Order

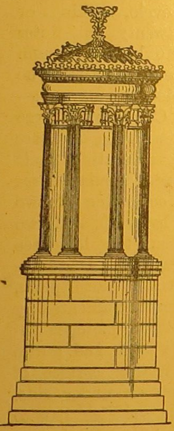


Fig. 1914.—Monument of Lysicrates.

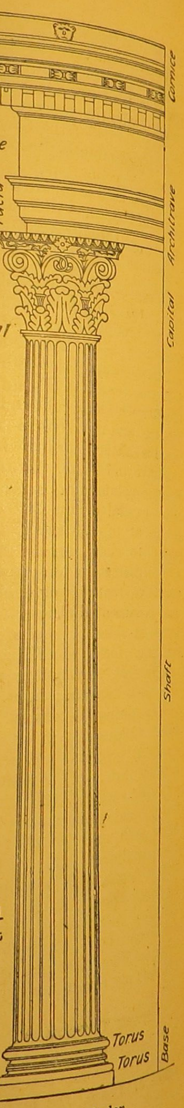


Fig. 1913.—Corinthian Order.

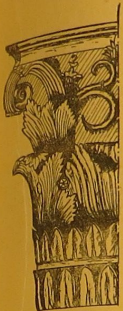


Fig. 1915.

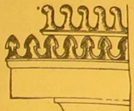


Fig. 1917.

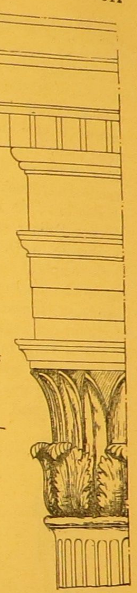


Fig. 1919.

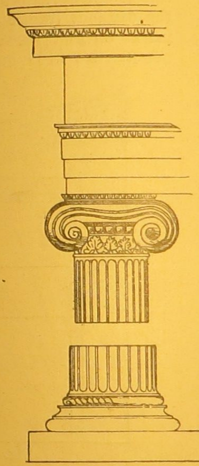


Fig. 1920.

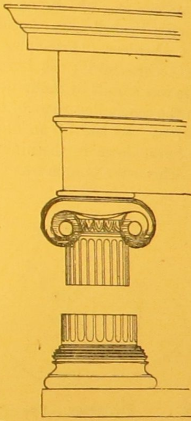


Fig. 1921.

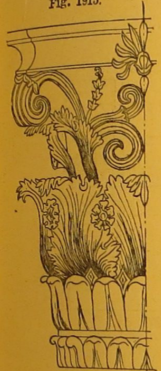


Fig. 1916.

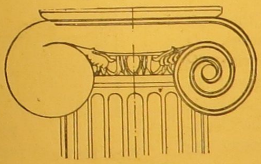


Fig. 1922.

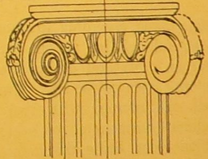


Fig. 1924.

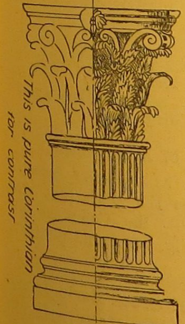

This is pure Corinthian for contrast

Fig. 1918.

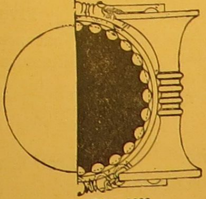


Fig. 1923.

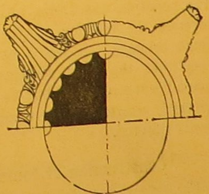


Fig. 1925.

Figs. 1915 to 1918.—Details of Monument of Lysicrates. Fig. 1919.—Capital and Entablature from Temple of the Winds. Figs. 1920 and 1921.—Greek Ionic Examples. Figs. 1922 to 1925.—Roman Ionic Examples.

Pæstum, three Grecian Doric temples, one hypæthral, one enneastyle, one hexastyle; at Syracuse, the Grecian Doric temple of Minerva; at Silenus, the temple of Jupiter in Grecian Doric hypæthral octastyle, and a smaller temple in Grecian Doric hexastyle: these places are all in Sicily. In Asia Minor there were—at Miletus, the Ionic temple of Apollo Didymæus; at Teos, the Ionic temple of Bacchus; at Priene, the Ionic temple of Minerva Polias; at Samos, the temple of Juno; at Ægesta, a Doric temple; at Ægina, the Doric temple of Jupiter Panhellenius. According to the Earl of Aberdeen ("Principles of Beauty in Grecian Architecture"), the temple of Minerva at Tegea was rebuilt by the famous Scopas of Paros in the concluding years of the Peloponnesian war, on the site of an older temple which was burnt down in the ninety-fourth Olympiad. This later temple was the largest, and, according to Pausanias, the most beautiful building in the Peloponnesus. It was an hypæthral edifice—that is, with the interior open to the sky. The interior of the cell was adorned with two rows of Ionic columns surmounted by others of the Corinthian order, being the first examples of the style in Greece mentioned by any writer. The peristyle was Doric, although Pausanias reverses the position of the Doric and the Ionic columns. A few shattered fragments constitute the only remains of this once magnificent structure; but as the situation is precisely ascertained, the whole plan might be easily restored.

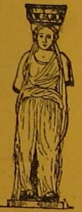


Fig. 1926.—Caryatide Figure.

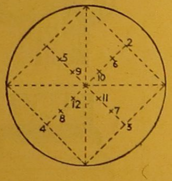


Fig. 1926a.—Eye of Ionic Volute.

Construction of Ionic Volute.

Fig. 1908, p. 507, shows an Ionic volute. To construct it, divide the height A B into eight equal parts, and number as shown in Fig. 1908 Draw horizontal centre line at 3½. Set off seven similar parts on base B C, and draw vertical centre line through E 3. The eye of spiral is set off as shown in Fig. 1926a, being one part in diameter. Commence with radius from point 1, and draw as far as centre line; then from point 2 reducing radius to continue from last portion, and so on. For the inner spiral, work backwards from where the double line commences, taking the centre at one-fourth the distance from 8 to 12 as shown by cross-marks on Fig. 1926a; continue with centre at one-fourth 7 to 11, and so on.

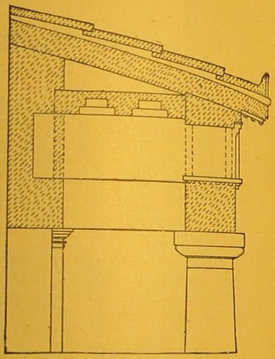


Fig. 1927.

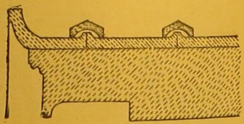


Fig. 1928.

Figs. 1927 and 1928.—Sections of Greek Roof Tiling.

Five Orders of Architecture.

What are known as the five orders of architecture comprise the Doric (Fig. 1909), the Ionic (Fig. 1910), the Composite (Fig. 1911), the Tuscan (Fig. 1912), and the Corinthian (Fig. 1913).

Three Examples of Greek Doric Order.

The best three examples of the Doric order are:—The temple at Corinth (B.C. 650), the temple of Theseus at Athens (B.C. 465), the Parthenon at Athens (B.C. 438). The height of one of the columns of the Parthenon is 11 modules 0 parts (18 ft. 8·8 in.); the entablature, 4 modules 11 parts (7 ft. 1·75 in.). The height of a Doric column in general varies from 4 to 6½ of the lower diameters (8 to 13 modules). Other Doric examples are:—Temple of Minerva at Athens, temple of Jupiter Nemæus between Argos and Corinth, the Propylæa and Portico of the Agora at Athens, the temple of Apollo in Delos, the temples of Juno Lucina and Concord at Agrigentum, the temple at Egesta, the temples at Pæstum and Silenus.

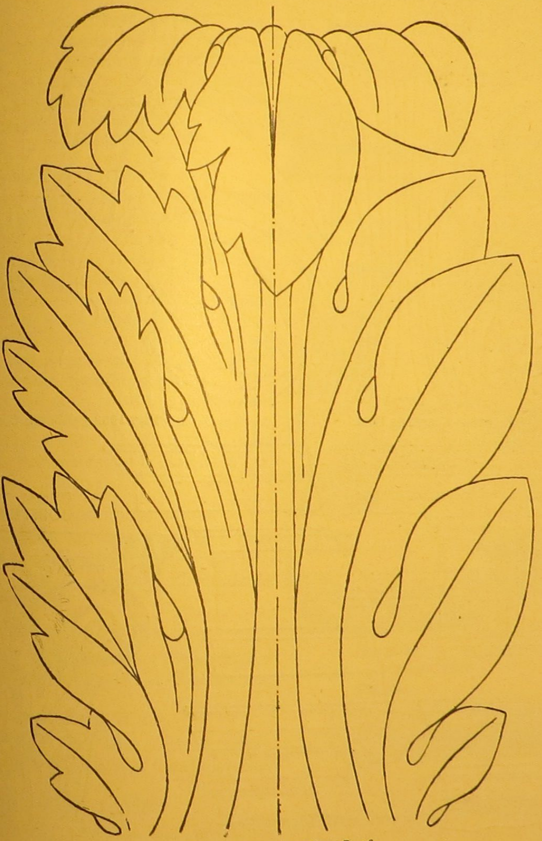


Fig. 1929.—Acanthus Leaf.

Choragic Monument of Lysicrates.

The Choragic Monument of Lysicrates, called also the Lantern of Demosthenes, is one of the most beautiful fragments of antiquity existing.

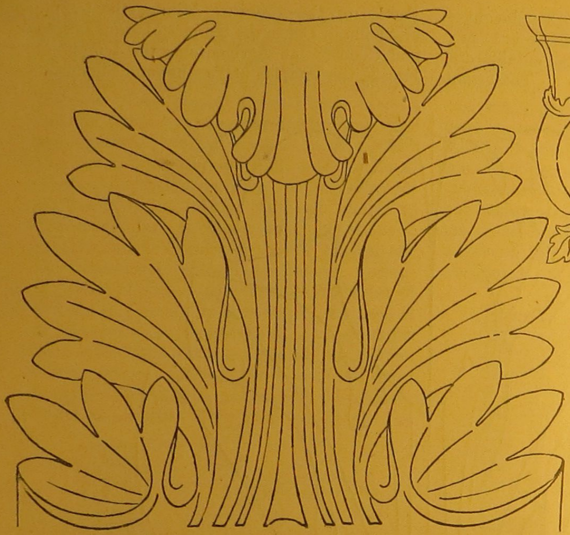


Fig. 1930.—Acantbus Leaf.

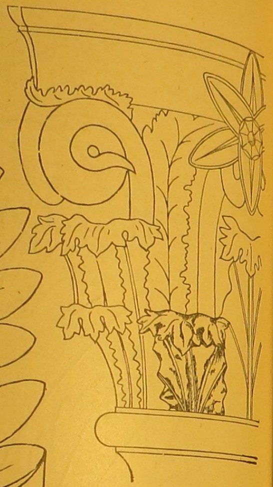


Fig. 1932.—Roman Corinthian Capital.

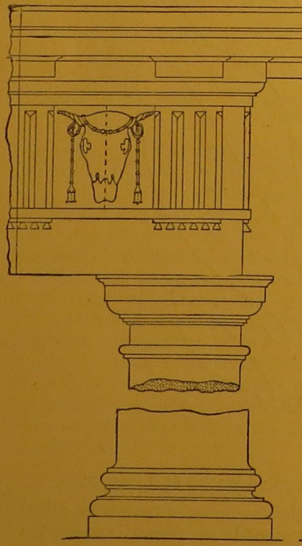


Fig. 1934.—Roman Doric Order.

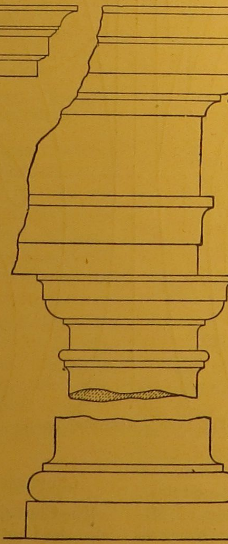


Fig. 1933.—Tuscan Order.

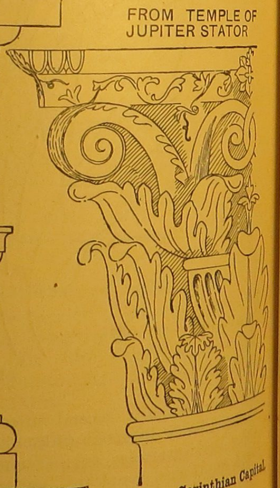


Fig. 1931.—Roman Corinthian Capital.

The whole height is but 34 ft., and its diameter 8 ft. It is a circular temple, with six engaged columns standing on a basement nearly as high as the columns, and nearly solid. The capitals, though not like most Corinthian capitals, are very beautiful (see Figs. 1914 to 1918). The frieze is sculptured, and, instead of a cymatium to the cornice, there is an ornament of honeysuckles, and above that, on the roof, which is beautifully carved in leaves, is a line of waved projecting ornament; on the top is a vase, or more probably the base of a tripod.

Tower of the Winds.

The Tower of the Winds, or Temple of the Winds, also known as the octagon tower of Andronicus Cyrrhestes (see Fig. 1919), is chiefly valuable for its sculpture; it has two doorways of a composite order, and in the interior is a small order of a Doric of very inferior proportions, which rises to the support of the roof from a plain string, below which are two cornices, or rather tablets. The roof is of marble, cut into the appearance of tiles. The outside walls are plain, with an entablature and a string below, forming a sort of frieze, on which are the personified figures of the Winds. On the whole, this monument is curious rather than beautiful. (Rickman.)

Greek Ionic and Roman Ionic.

For the purposes of comparison, Figs. 1920 and 1921, showing the Greek Ionic order, and Figs. 1922 to 1925, showing the Roman Ionic order, are presented.

Caryatide Figures.

Fig. 1926 is a sketch of one of the Caryatide figures from the portico of the Erechtheum, Athens.

Greek Roof Tiling.

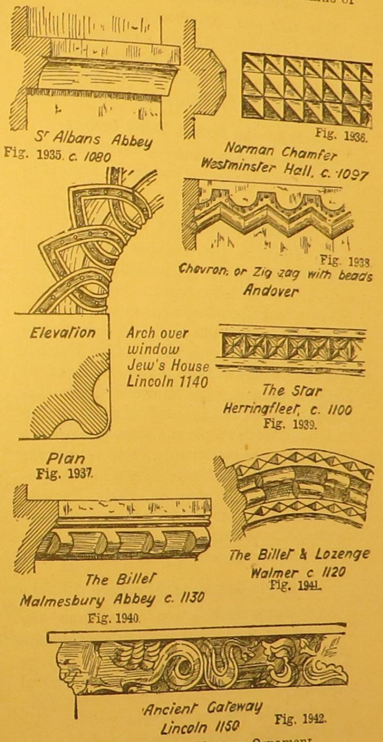
Figs. 1927 and 1928 are sectional views showing the mode of using roof tiles in Grecian architecture.

Acanthus Leaves.

Two varieties of acanthus leaf are illustrated by Figs. 1929 and 1930, the latter being the one used in the Corinthian order of architecture.

Openings in Greek and Roman Architecture.

In Grecian architecture the openings were of minor importance, and were necessarily small, owing to the trabeated (or beam) style of the architecture requiring the supports to be close enough to carry stone lintels of such length as could be obtained, and some of the openings were diminished towards the top. The monotony of a flat surface with rectangular openings was relieved by the heavy shadows in the spaces between the columns of the façade. In Roman architecture the openings were usually surmounted by semicircular arches, and the whole structure was treated with more freedom, the openings being made prominent features of the building. The round-headed arches of Norman architecture were due to the revival of Roman models.



Figs. 1935 to 1942.—Norman Ornament.

Roman Arches.

The arch of Titus (A.D. 81) is a single arch of the Roman Composite order. The arch of Septimius Severus and the arch of Constantine each consist of a central arch with a smaller one on each side. All three of these are well known.

Roman Corinthian Capital.

Figs. 1931 and 1932 show in elevation two Roman Corinthian capitals. The outlines of the ornament are made clear, and only one leaf is drawn in detail. That shown by Fig. 1931 is from the temple of Jupiter Stator.

Tuscan and Roman Doric Orders.

Columns and entablature of the Tuscan and Roman Doric orders are shown in Figs. 1933 and 1934.

English Architecture Classified.

According to the simplest classification English architecture is divided into round arched and pointed arched. Some writers however, look upon Anglo-Saxon and Norman as distinct styles transplanted to these shores from abroad, and give the title of English architecture only to those styles developed in England—namely, those known as Early English, Decorated, and Perpendicular—assuming that the later developments were not worthy of the name of architecture. Others make a very full classification, enumerating Anglo-Saxon, Norman, Transition, Early English, Geometrical, Decorated, Flamboyant, Perpendicular, Elizabethan, Jacobean, Queen Anne, Adam architecture, etc.

Anglo-Saxon Architecture.

Anglo-Saxon architecture dates from the latter part of the seventh century to about the middle of the eleventh century. The buildings were mostly cruciform in plan, with a central tower and a circular apse at the eastern end; sometimes the western end was also circular, as at Abingdon, Berkshire, and a second tower was sometimes placed at the western end, as at Ramsey, in Huntingdonshire. The larger buildings had crypts with vaulted roofs, as at Repton, in Derbyshire. Sometimes a tower was placed only at the western end, as at Barton-on-Humber, in Lincolnshire, and at Brixworth and Earl's Barton, in Northamptonshire. The construction in many cases bore a strong resemblance to timber work, having a kind of framework of stone filled in with rubble; the quoins were typical of Anglo-Saxon style, being arranged with stones of equal size placed alternately in a vertical and horizontal position upon each other, called "long and short work." The heads of the doorways were either triangular or semicircular. The prevailing character is massiveness, with only the occasional introduction of a moulding, which in most cases consists simply of a square-faced projection with a chamfer or splay upon the upper or lower edge. The principal buildings of which remains exist are a church at Ripon, cathedral at Hexham, monastery at Wearmouth (A.D. 674), monastery at Jarrow (A.D. 684), church at Abingdon, cathedral at York (A.D. 767), abbey at Ramsey, Huntingdonshire (A.D. 974), church at Barton-on-Humber, Lincolnshire, churches at Brigsworth and Earl's Barton, Northamptonshire, church at Barnack, and, lastly, monastery at Bury St. Edmunds. Westminster Abbey was rebuilt A.D. 1065, and is in the Anglo-Norman style, although, as the date just given indicates, its reconstruction was planned and executed before the Conquest had taken place.

Local Diversities in English Architecture.

The physical geography or surface geology of England varies with great regularity from east to west, and with less regularity in other directions, the strata being inclined so that all geological epochs are exposed to view at the same time. On the east coast there are the recent deposits of sand, gravel, and clay, followed further inland by the upper and lower chalk with beds of flint, then limestone in abundance, and further on sandstone; while as the west coast is reached there are found old red sandstone, slate, and lastly granite. A practically similar distribution is found from south to north, but there are various minor breaks and local peculiarities. For building choice would naturally be made in the first instance of the materials found on the spot, to avoid the cost of transit, and the natives would be the most efficient workmen in that material; hence there would grow up a local style or fashion depending on these circumstances. So in London and the eastern counties there are found much brickwork and tiled roofing, owing to the readiness with which clay is obtained; while in the West of England the very fences between the fields are made of granite, because of its abundance. It would be easy to show how the architectural details depend on the material in which they are worked, how the brickwork has to depend for its effect on the grouping of its masses, on the fenestration, the gables, and chimney stacks; how limestone lends itself to carving and moulding, so that Gothic cathedrals could be built from it; how granite, from its stubbornness, is only suited for heavy, massive work and classic architecture of great solidity. And it must not be forgotten that where forests abound, as formerly in England, half-timbered houses are the most natural structures, and may be found scattered over more than half the kingdom, from Ipswich to Chester and from Winchester to Lincoln. Other diversities would be produced by the local peculiarities of site and climate. Near the sea, hollow walls would be used to keep the interior of the building dry. In the open country, houses are built for roomy convenience and picturesqueness, generally on two or at most on three floors, and the appurtenances of the house proper are suitable to a country life. In a town, where land is more valuable, the rooms are piled on each other, and a cramped style of architecture is inevitable, although the design may be appropriate to the surroundings. Regarding the different periods of English architecture, it may be said that Anglo-Saxon terminated about 1066; Anglo-Norman flourished from 1066 to 1190; Early English, 1190 to 1300; Decorated English, 1300 to 1380; Perpendicular, 1380 to 1550; Elizabethan and Anglo-Italian, 1550 to 1625.

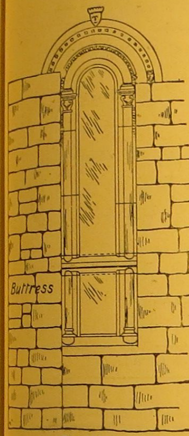


Fig. 1943.

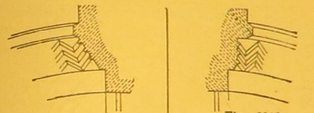


Fig. 1947.

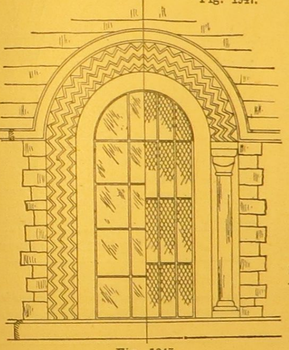


Fig. 1945.

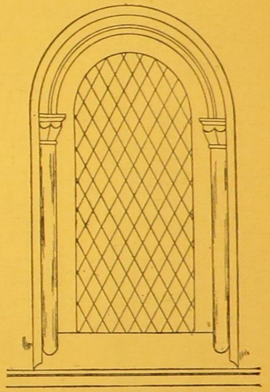


Fig. 1948.

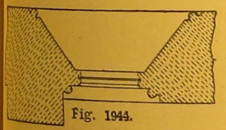


Fig. 1944.

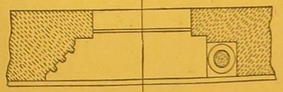


Fig. 1946.

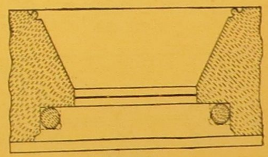


Fig. 1949.

Figs. 1943 to 1949.—Typical Norman Windows.

Romanesque Style.

Romanesque architecture is better known in England under the names of Saxon and

Norman architecture. It was introduced from Normandy by William the Conqueror and the Normans associated with him. It should therefore be called Norman-Romanesque. The year A.D. 1000 was expected to be the end of the world, and for some time previously there was very little building, and that only on a small scale; but the year having passed without any catastrophe, there was a general revival of building, and a return to substantial construction, cylindrical vaulting for aisle roofs, and, later, for nave roofs, being introduced. The models taken were chiefly the basilicæ of Rome and other cities of Italy, which had been erected between the time of Constantine, in A.D. 324, and the incursion of the Goths in the sixth century, but the style was largely influenced by the revival of Classic architecture in Italy and on the Continent generally. The Romanesque period in England may be taken as from 1000 to 1150 A.D. The chief points of the style were: thick stone walls without buttresses, semicircular arches in single rings of voussoirs, or in receding rings in thicker walls, piers and columns very massive and plain, capitals of columns in varieties of the cushion, windows only as narrow slits splayed on the inside with semicircular heads. Examples: Parts of Westminster Abbey, Waltham Abbey, Canterbury Cathedral, Rochester Cathedral, Chester Cathedral, St. Mary's, Walmer, St. John's, Chester, Studland Church, Chapel in the Tower of London, Hedingham Castle, Essex, etc.

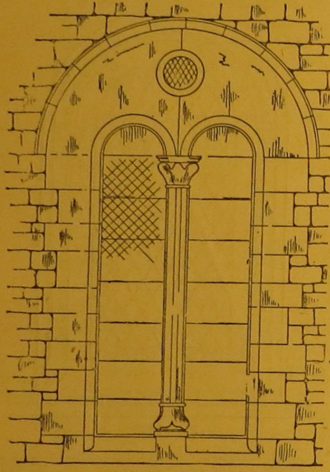


Fig. 1950.

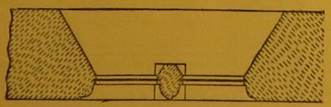


Fig. 1951.

Figs. 1950 and 1951.—Norman Window.

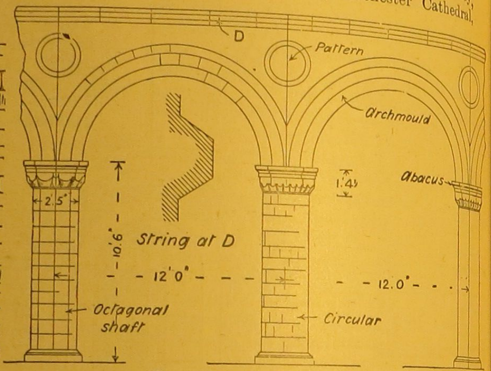


Fig. 1952.—Norman Nave Arcade.

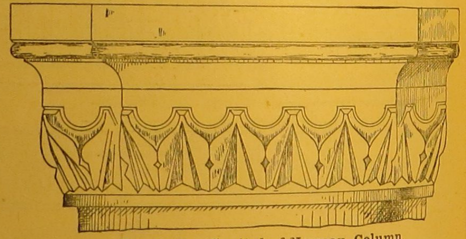


Fig. 1953.—Capital of Norman Column.

The Norman Styles.

Early Norman, 1066-1090. (*a*) Examples: Transept, White Tower, Tower of London; Transept, Winchester. (*b*) General style, massive and plain, with wide masonry joints. (*c*) Walls thick and plain, with sometimes shallow buttresses. (*d*) Doorways plain, round-headed with square angles, recessed and diminished in

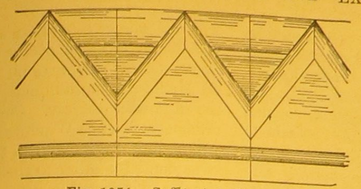


Fig. 1954.—Soffit at A (Fig. 1956).

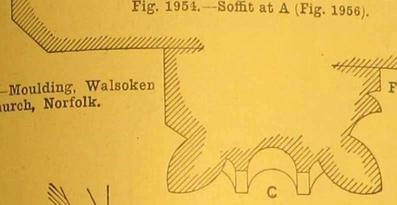


Fig. 1955.—Moulding, Walsoken Church, Norfolk.

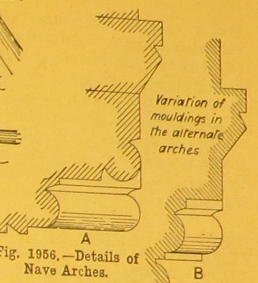


Fig. 1956.—Details of Nave Arches.

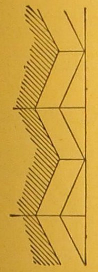


Fig. 1957.—Section at C (Fig. 1955).

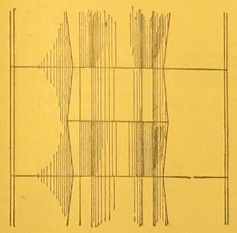


Fig. 1958.—Soffit at C (Fig. 1955).

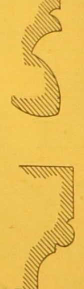


Fig. 1959.—Abacus.

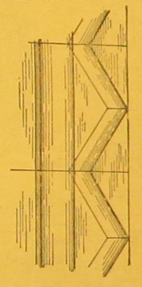


Fig. 1960.—Soffit at B (Fig. 1956).

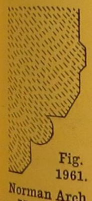


Fig. 1961. Norman Arch Moulding, Fountains Abbey.

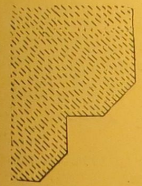


Fig. 1962.—Norman Arch Moulding, St. Peter's, Oxford.

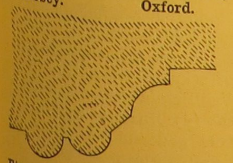


Fig. 1963.—Norman Arch Moulding, Stoke Orchard, Gloucester.

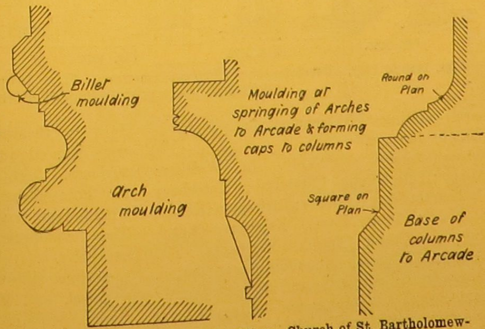

Billet moulding
Arch moulding
Moulding at springing of Arches to Arcade & forming caps to columns
Round on Plan
Square on Plan
Base of columns to Arcade

Fig. 1964.—Norman Arch Mouldings, Church of St. Bartholomew-the-Great, Smithfield.

thicker walls, no tympanum. (*e*) Mouldings were plain chamfer, round and quarter-round. (*f*) Windows long, narrow, and round-headed, in single lights or groups of single lights. (*g*) Arches all round-headed, plain square angles, recessed or doubly recessed. (*h*) Capitals to columns plain square block, with lower corners rounded off and the same style repeated side by side on the faces of larger blocks. (*i*) Vaulting narrow, plain semi-cylindrical shape, called barrel vaulting. (*j*) Ornament formed principally by the axe.

Late Norman, 1090-1150. (*a*) Waltham Abbey; Peterborough Cathedral; Canterbury Cathedral; Iffley (Oxford); Barfreston (Kent); St. Martin's Priory (Dover); Newhaven Church (Sussex); Castor Church (Northants). (*b*) Structure lighter and abundantly ornamented. Stones dressed more truly and laid with thinner joints. (*c*) Walls thinner and buttresses more projecting, with small shafts recessed in the external angles. (*d*) Doorways round-headed and deeply recessed, giving splayed jambs and nook shafts. Tympanum richly sculptured. (*e*) Mouldings more numerous and deeper, but not in greater variety. Surfaces of mouldings ornamented. (*f*) Windows shorter and wider, still round-headed, but in two or three lights. Ornamented similar to the doorways. Large circular windows in the gable ends as at Waltham Abbey, Barfreston (Kent), and St. James's (Bristol). (*g*) Round-headed arches with deep edge mouldings and ornamented flat surfaces. Arcades introduced, followed by the first Pointed arches. (*h*) Capitals rudely carved with foliage, fruit, flowers, animals, figures, etc. The development may be traced in various examples. (*i*) Vaulting wider, groined, and sometimes ribbed. (*j*) Ornament worked with a chisel, and more undercut and elaborate. Eight specimens of Norman ornament are illustrated by Figs. 1935 to 1942. For plans

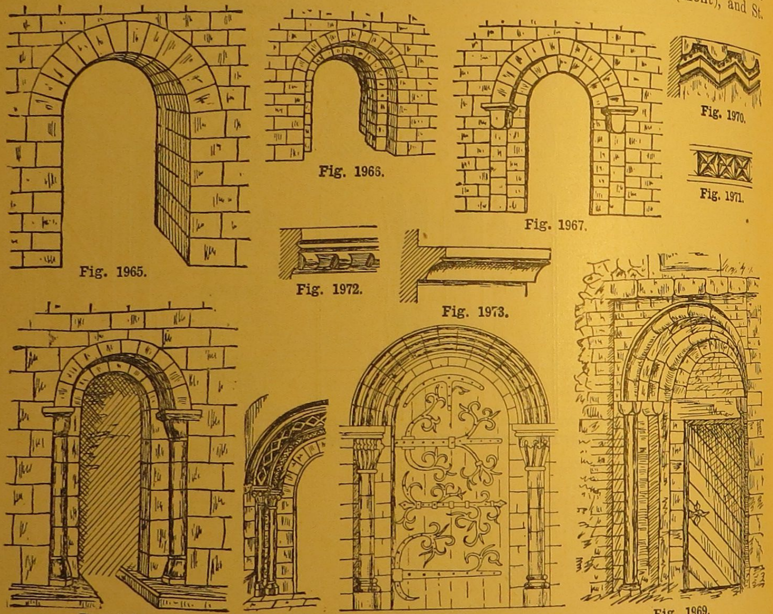


Fig. 1965.
Fig. 1966.
Fig. 1967.
Fig. 1970.
Fig. 1971.
Fig. 1972.
Fig. 1973.
Fig. 1968.
Fig. 1974.
Fig. 1975.
Fig. 1969.

Figs. 1965 to 1969.—Development of Norman Doorways. Figs. 1970 to 1974.—Norman Ornament. Fig. 1975.—Doorway at Faringdon, Berks.

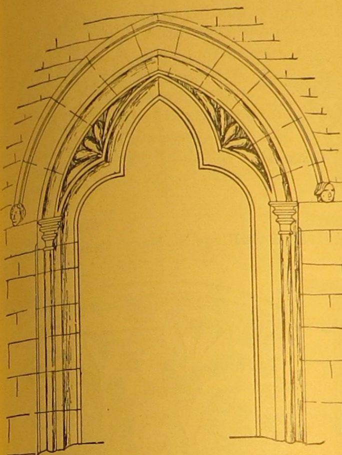


Fig. 1976.—Priests' Door, Irchester, Northants.

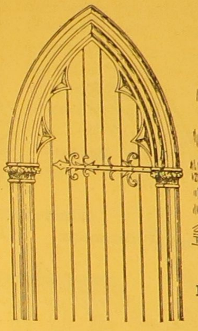


Fig. 1977. — Cinquefoil Arch.

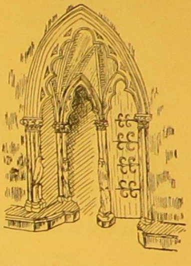


Fig. 1978.—Multiple Foiled Arch.

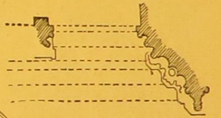


Fig. 1979.—Early English Door Mouldings.

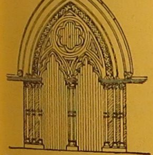


Fig. 1982. — Typical Early English External Doorway.

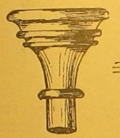


Fig. 1983. — Inverted Bell Capital.

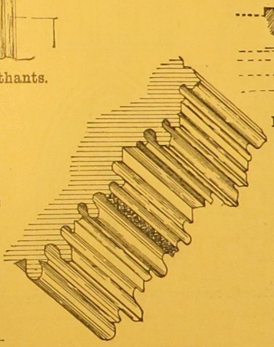


Fig. 1980.—Early English Door Moulding.

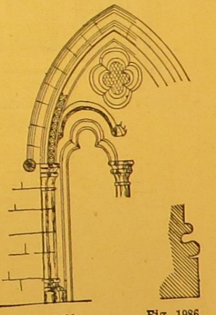


Fig. 1981. Fig. 1986.

Fig. 1981.—Typical Early English External Doorway. Fig. 1986.—Moulding at Base of Column.

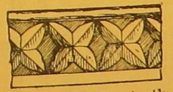


Fig. 1987.—Dog-tooth Ornament.

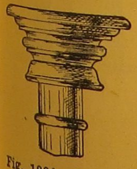


Fig. 1984.—Inverted Bell Capital.

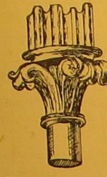


Fig. 1985. — Carving under Cap Moulding to Column.

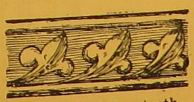


Fig. 1988.—Dog-tooth Ornament.

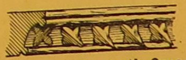
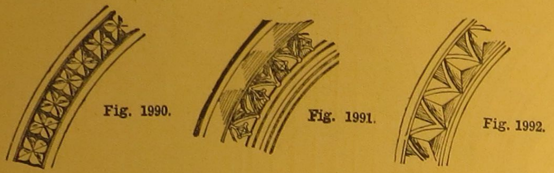


Fig. 1989.—Dog-tooth Ornament.



Figs. 1990 to 1992.—Dog-tooth Ornaments.

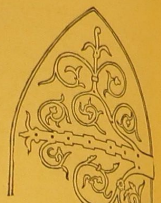


Fig. 1993.

Fig. 1993.—Door Hinge, St. Mary's Church, Norwich.

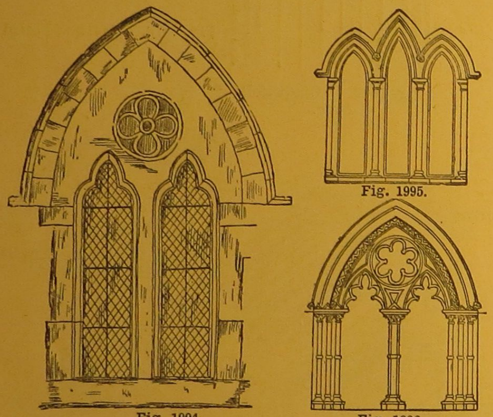


Fig. 1994.
Fig. 1995.
Fig. 1996.

Figs. 1994 to 1996.—Thirteenth-century Windows and Doorway.

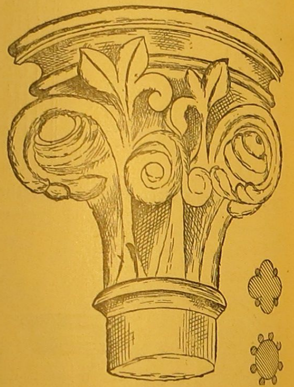


Fig. 1997.
Fig. 1998.

Figs. 1997 and 1998.—Thirteenth-century Capital and Shafts.

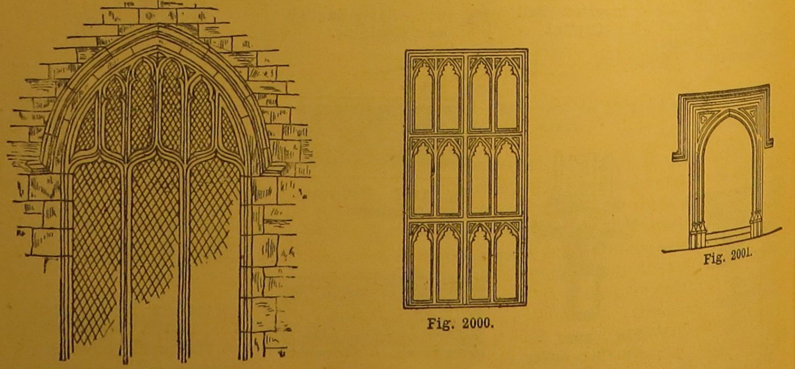
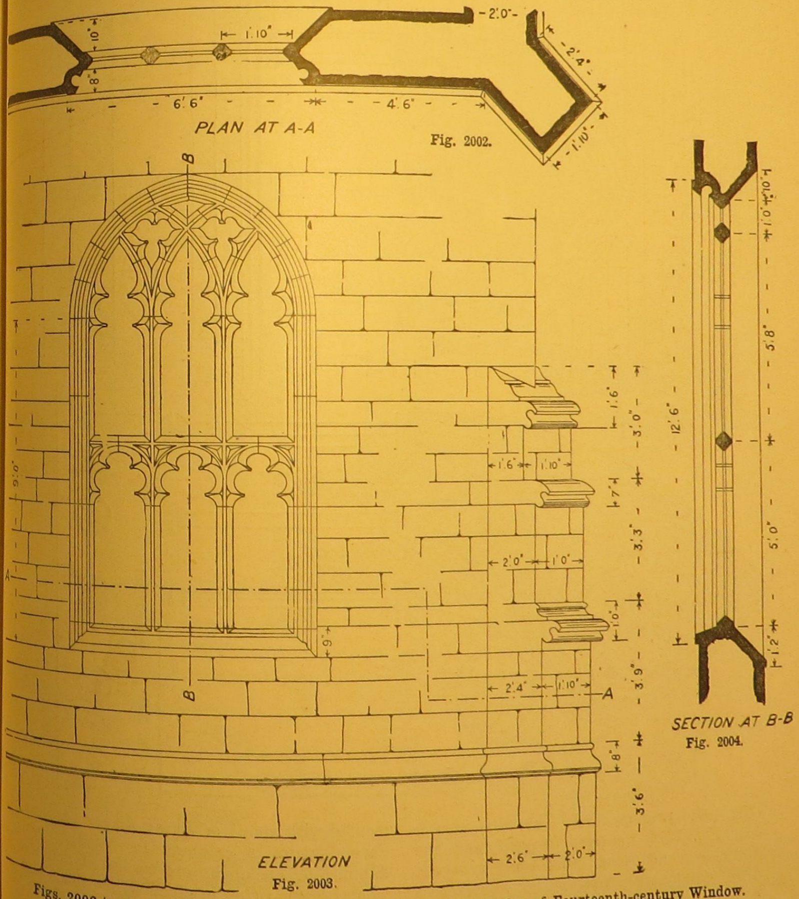


Fig. 1999.
Fig. 2000.
Fig. 2001.

Figs. 1999 to 2001.—Fifteenth-century Windows and Doorway.

and elevations of typical Norman windows, see Figs. 1943 to 1951. Fig. 1952 represents the Norman nave arcade in Walsoken Church, Norfolk; Fig. 1953 a column capital; and Figs. 1954 to 1960 show details. Figs. 1961 to 1964 represent Norman arch mouldings from various buildings indicated, including St. Bartholomew-the-Great, Smithfield. The earliest Norman doorways were plain square-edged openings in the walls, with semicircular arches above (Fig. 1965). In thick walls the doorways were formed in the same manner, but in receding planes (Fig. 1966). Then cushion corbels were added (Fig. 1967), and these were followed by nook shafts with cushion capitals and bases (Fig. 1968). The square angles of the doorways then became rounded, with a quirk on each side forming a staff bead or the Norman



Figs. 2002 to 2004.—Sectional Plan, Elevation, and Vertical Section of Fourteenth-century Window.

edge roll or "bowtell" (Fig. 1969), and the surfaces between the mouldings were ornamented with various patterns, in which the zigzag or chevron (Fig. 1970) and the star (Fig. 1971) predominated. The billet moulding (Fig. 1972) was also frequent, and the Norman chamfer (Fig. 1973), which arose out of the ornamented dripstone, but was likewise used as a horizontal ornament Later in the period the ornamentation became more profuse and the details of the structures less massive, the capitals of the columns rudely carved (Fig. 1974), and the shafts sometimes ornamented with spiral or zigzag diaper patterns. Several pairs of columns in receding and diminishing openings were employed, and the whole became richer in effect. When the actual opening of the doorway was rectangular, the

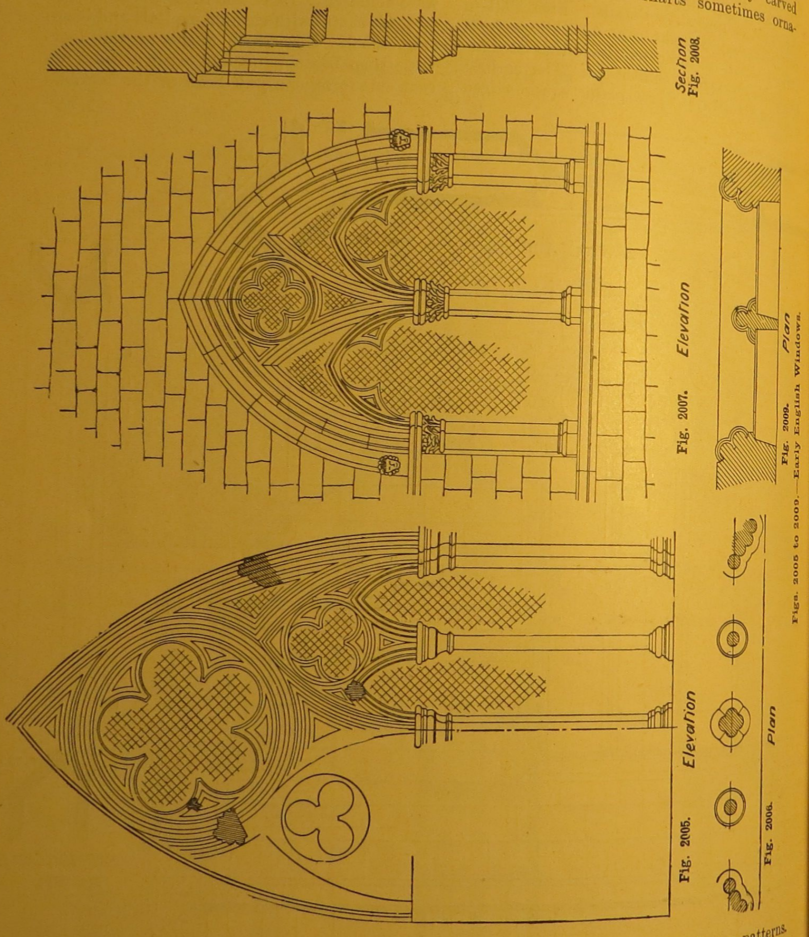


Fig. 2005. *Elevation*

Fig. 2006. *Plan*

Fig. 2007. *Elevation*

Section Fig. 2008.

Fig. 2009. *Plan*

Figs. 2005 to 2009.—Early English Windows.

tympanum or space between the square head and semicircular arch was filled with sculpture, as at Rochester Cathedral and elsewhere.

Early English Doorways.

The doorway of the general Early English type is surmounted by an equilateral or wide lancet arch, with mouldings, but instances occur of a semicircular arch, as in Fig. 1975, at Faringdon, Berks; a trefoil arch, as in Fig. 1976, which represents the arch of the priests' door at Irchester, Northants; a cinquefoil arch, as in Fig. 1977; or a multiple foiled arch, as in Fig. 1978. The mouldings were

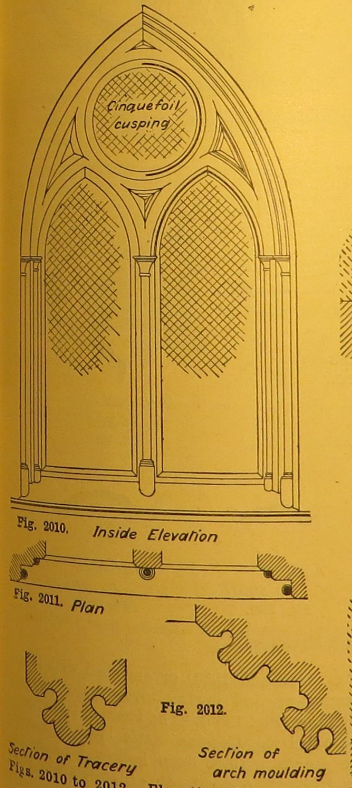


Fig. 2010. *Inside Elevation*

Fig. 2011. *Plan*

Section of Tracery

Fig. 2012.

Section of arch moulding

Figs. 2010 to 2012.—Elevation, Plan, and Mouldings of Early English Window.

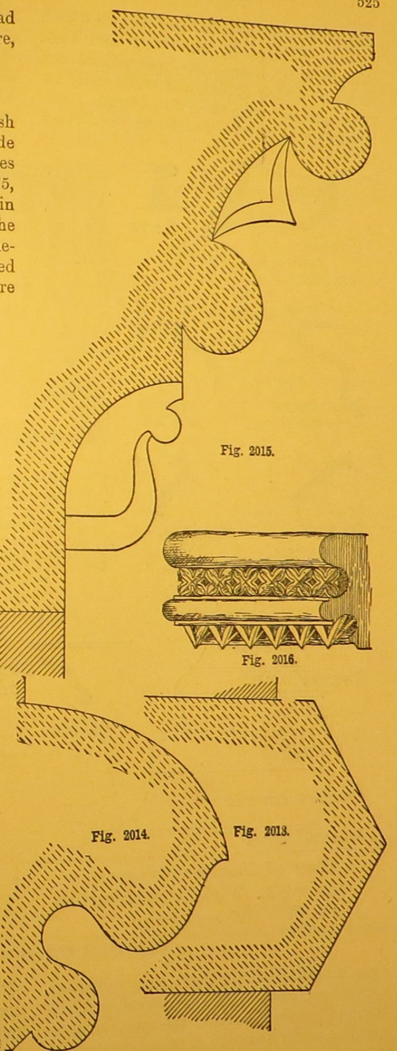


Fig. 2013.

Fig. 2014.

Fig. 2015.

Fig. 2016.

Figs. 2013 to 2016.—String-Courses.

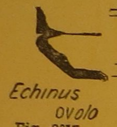


Fig. 2017.

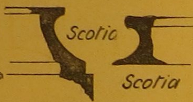


Fig. 2020

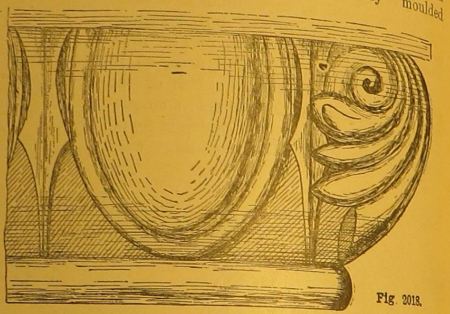


Fig. 2018.

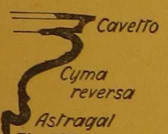


Fig. 2021.

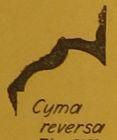


Fig. 2023.

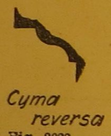


Fig. 2022.

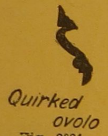


Fig. 2024.

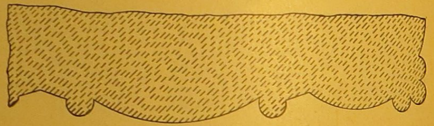


Fig. 2019.

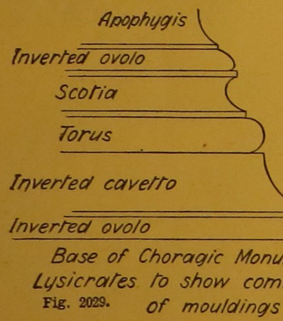


Fig. 2029.

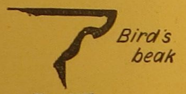


Fig. 2025.

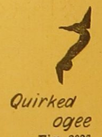


Fig. 2026

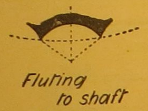


Fig. 2027.

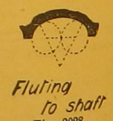


Fig. 2028.

Figs. 2017 to 2029.—Greek Mouldings.

deep undercut hollows and rounds, with narrow fillets as in Figs. 1979 and 1980. Sometimes the door arches were without any foliation in their outline, and occasionally internal doorways were made with a square head The principal external doorways were divided by a central column, either a single shaft or a clustered column, the cylindrical portions being of polished marble; the tympanum or spandrel perforated with a trefoil, quatrefoil, or multiple-foiled opening, and the whole enclosed in a more or less deeply moulded and recessed arch with a dripstone on the face following the outline of the arch, and terminated in corbels moulded with heads or roses, as in Fig. 1981 (from St. Cross, Hampshire) and Fig. 1982. The side columns were mostly nook shafts in recessed jambs, with inverted bell capitals plainly moulded (Figs. 1983 and 1984), or enriched with leaves running up and curling over under the cap moulding (Fig. 1985). The bases of the column resembled the Grecian Attic base in having two rounds with a deep hollow between, as Fig. 1986. The dog-tooth ornament was very largely used for enriching the mouldings and surfaces between them. There are varieties (as in Figs. 1987 to 1992) apparently derived from the zigzag and star ornaments of the Norman period, and sometimes carried down the jambs. The hinges of the doors were very elaborately wrought in scrollwork spread over the outer face of the door, as shown in Fig. 1993 (at St. Mary's Church, Norwich), and as already illustrated in Fig. 1975 (Faringdon, Berks).

Thirteenth-century windows and a doorway are shown by Figs. 1994 to 1996, and capitals of the same period by Figs. 1997 and 1998. Fifteenth-century windows and a doorway are illustrated by Figs. 1999 to 2001.

Early English Windows and Base Mouldings.

Figs. 2002 to 2004 represent plan, elevation, and section of a fourteenth-century window, taken from the south aisle, St. Peter's Church, Nottingham. Alternative sketches of Early English windows with their characteristic mouldings and other details are presented by Figs. 2005 and 2006, Figs. 2007 to 2009, and Figs. 2010 to 2012.

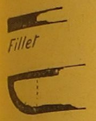


Fig. 2030.

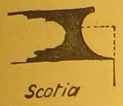


Fig. 2031.

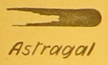


Fig. 2032.

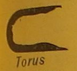


Fig. 2033.

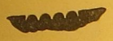


Fig. 2034.

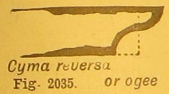


Fig. 2035.

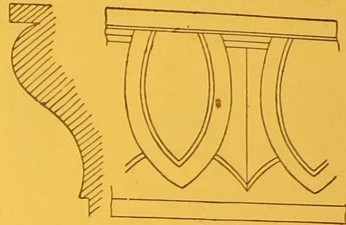


Fig. 2036.

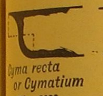


Fig. 2038.

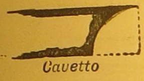


Fig. 2039.

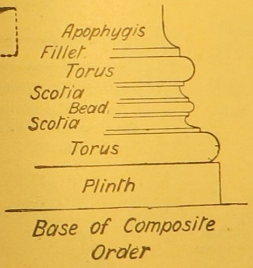


Fig. 2042.

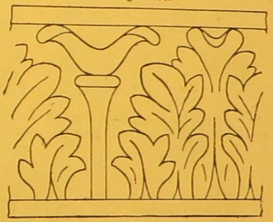


Fig. 2037.

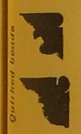


Fig. 2040.

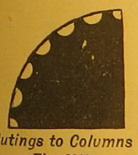


Fig. 2041.

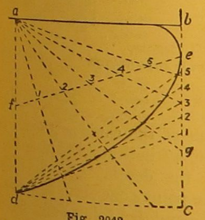


Fig. 2043.

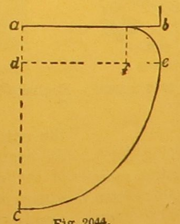


Fig. 2044.

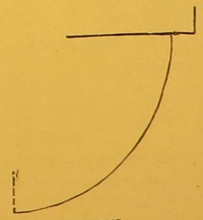


Fig. 2045.

Figs. 2030 to 2042.—Roman Mouldings. Fig. 2043.—Greek Ovolo. Fig. 2044.—Roman Moulding resembling Greek Ovolo. Fig. 2045.—Roman Ovolo.

Early English String-courses.

Fig. 2013 shows the variety of string-course most frequently used in the Early English period, examples being in existence at Wrington, Somersetshire ; Elsfield Church, Oxfordshire ; and Ravensthorpe, Northants. Figs. 2014 and 2015 are other examples of Early English string-courses. An ornamental string-course of the thirteenth century is shown by Fig. 2016.

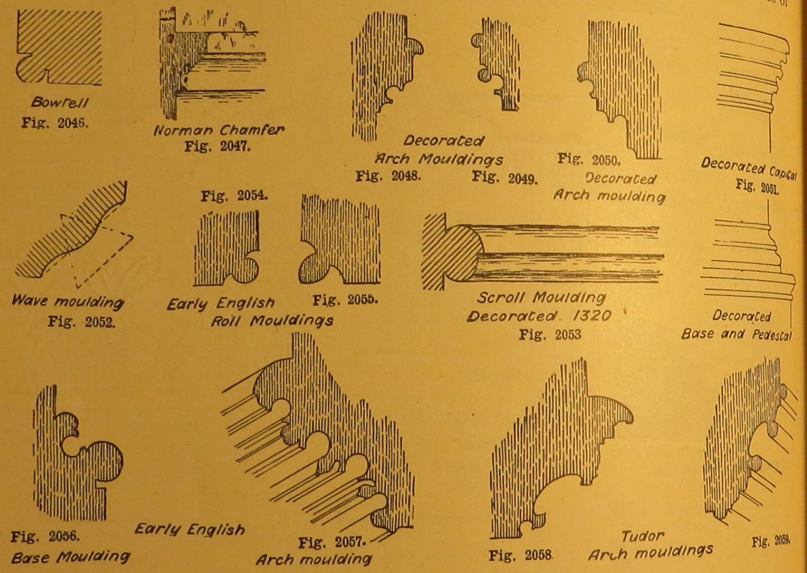


Fig. 2046. Fig. 2047. Fig. 2048. Fig. 2049. Fig. 2050. Fig. 2051. Fig. 2052. Fig. 2053. Fig. 2054. Fig. 2055. Fig. 2056. Fig. 2057. Fig. 2058. Fig. 2059.

Figs. 2046 to 2059.—English Mouldings.

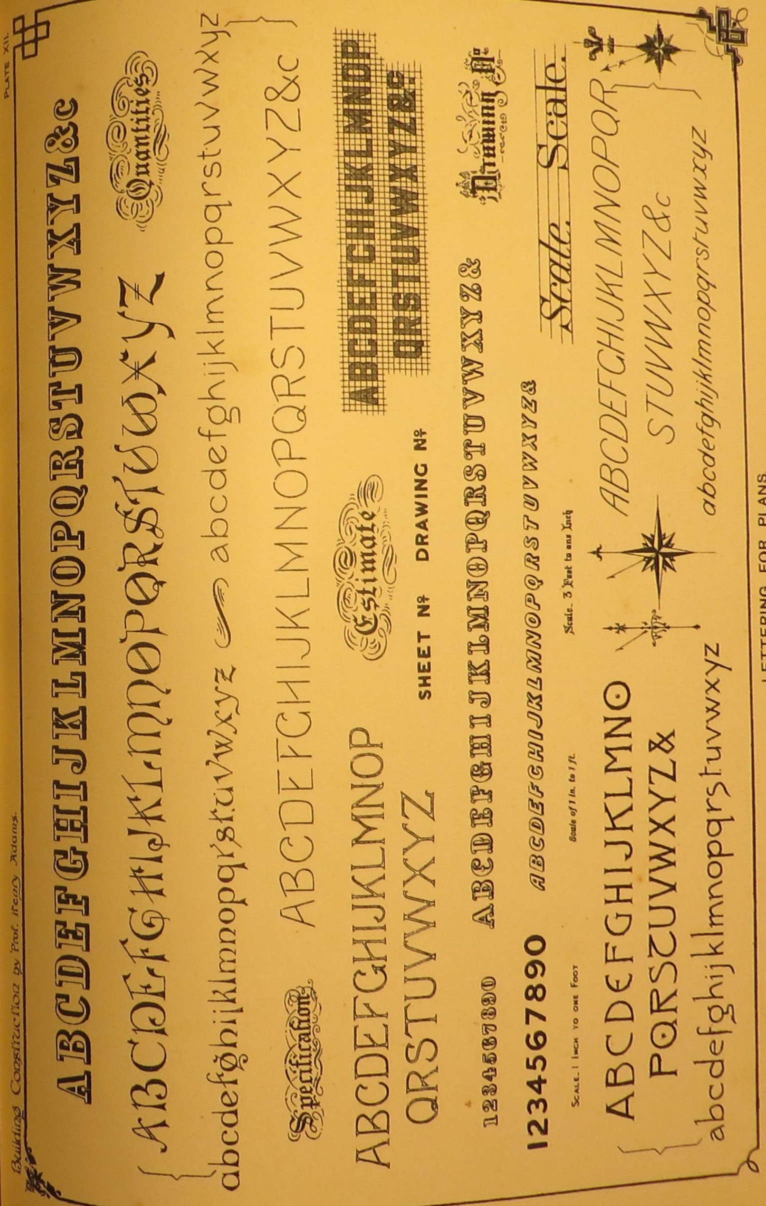
Mouldings.

Greek Mouldings.—Echinus ovolo (Fig. 2017), which may have carved ornamentation as in Fig. 2018, scotia (Figs. 2019 and 2020), cavetto, cyma reversa, and astragal (Figs. 2021 to 2023), quirked ovolo (Fig. 2024), bird's beak (Fig. 2025), quirked ogee (Fig. 2026), fluting to shaft (Figs. 2027 and 2028), base of Choragic Monument of Lysicrates showing combination of mouldings (Fig. 2029).

Roman Mouldings.—Fillet (Fig. 2030), scotia (Fig. 2031), astragal (Fig. 2032), torus (Fig. 2033), reedings (Fig. 2034), cyma reversa or ogee (Fig. 2035) which may have carved ornamentation as in Figs. 2036 and 2037 ; cyma recta or cymatium (Fig. 2038), cavetto (Fig. 2039), quirked beads (Fig. 2040), flutings to columns (Fig. 2041), and base of composite order showing combination of mouldings (Fig. 2042).

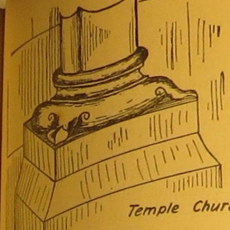
Greek and Roman Mouldings Compared.—Regarding the difference between the Greek and Roman mouldings, Grecian ovolo (Fig. 2043) is not a regular compass curve, but partakes of the nature of some of the conic sections. In the example shown, *a b* indicates the projection of the curve, *b c* the depth. Complete the square *a b c d*, take point *e* one-sixth of *b c*, and *f* midway between *a* and *d*. Join *e f* and divide it into six equal parts. From *a* draw lines through each of these divisions *f*, 1, 2, 3, 4, 5, 6, to meet the outline of the square. Take *e g* = $\frac{1}{2}$ *b c*, and divide it into six equal parts, numbered from *g* upwards. From these points draw lines to meet point *d*, then the intersection of similarly numbered lines will give the outline of the Grecian quirked ovolo. A similar Roman moulding would be drawn with

PLATE XII.



Building Construction by Prof. Henry Adams.

LETTERING FOR PLANS.



Temple Church, London

Fig. 2060.

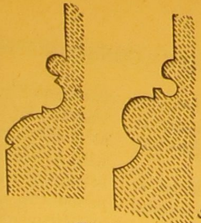
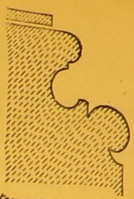
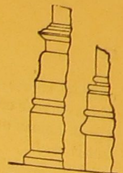


Fig. 2061.



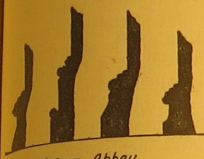
Stone Church, Kent

Fig. 2062.



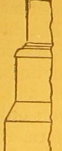
Fountains Abbey Choir

Fig. 2063.



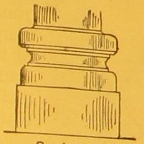
Tintern Abbey

Fig. 2064



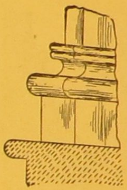
Howden Church

Fig. 2065.



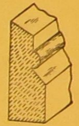
Rochester Cathedral

Fig. 2066.



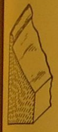
York Cathedral

Fig. 2067.



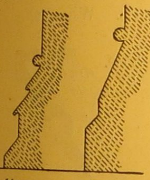
Iffley Church Oxfordshire

Fig. 2068.



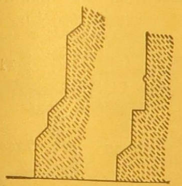
Wolston Warwickshire

Fig. 2069.



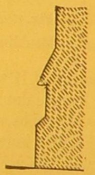
Nave Choir
Tintern Abbey

Fig. 2070.



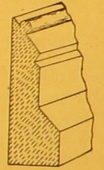
Fountains Abbey

Fig. 2071.



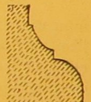
Howden Church

Fig. 2072.



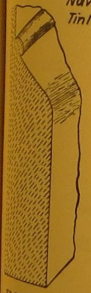
Steetley Ch. Derbyshire

Fig. 2073.



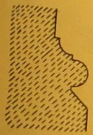
Peterboro A.D. 1143

Fig. 2074.



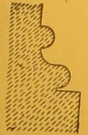
St Peters Northants

Fig. 2075.



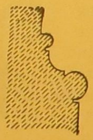
Glastonbury A.D. 1180

Fig. 2076.



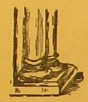
Castle Rising Norfolk

Fig. 2077.



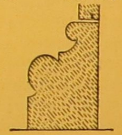
Peterboro'

Fig. 2078.



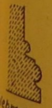
Window Shaft Stanton Harcourt

Fig. 2079.



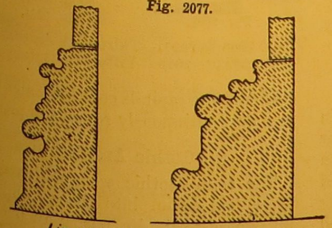
Casterton Church Rutland

Fig. 2080.



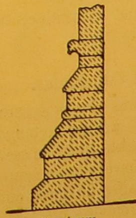
olebrook Northants.

Fig. 2081.



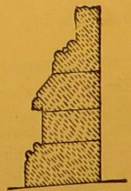
Lincoln Cathedral. A.D 1220

Fig. 2082.



Hexham

Fig. 2083.



Bridlington

Fig. 2084.

Figs. 2060 to 2078.—Twelfth-century Mouldings. Figs. 2079 to 2084.– Thirteenth-century Mouldings.

compass curves as in Fig. 2044, where the whole curve is composed of two quadrants. In a plain Roman ovolo (Fig. 2045) a single quadrant is used.

English Mouldings.—The bowtell, boutel, or beautel (Fig. 2046) was the first moulding introduced into English architecture. It was like a staff bead or angle bead, being a double quirked roll on the square edges of arches and other openings in masonry. It is also known as the Norman edge roll, and was applied to pillars as well as to arches. The Norman chamfer moulding is shown by Fig. 2047; mouldings of the Decorated style by Figs. 2048 to 2051; the wave moulding or swelled chamfer by Fig. 2052, this being a shallow moulding of the Decorated period, consisting of three tangent curves struck from the angles of an equilateral triangle whose base is parallel to the chamfer plane; the scroll moulding belonging to the Decorated style by Fig. 2053; the Early English mouldings by Figs. 2054 to 2057; the Tudor mouldings by Figs. 2058 and 2059; twelfth-century mouldings by Figs. 2060 to 2078; thirteenth-century mouldings by Figs. 2079 to 2091; and fifteenth-century mouldings by Figs. 2092 to 2095.

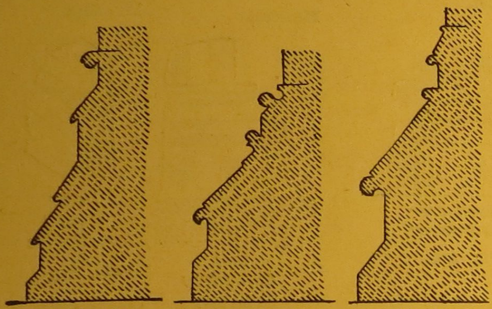
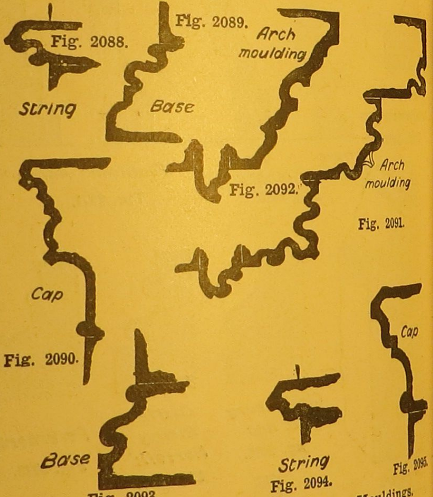


Fig. 2085. Fig. 2086. Fig. 2087.

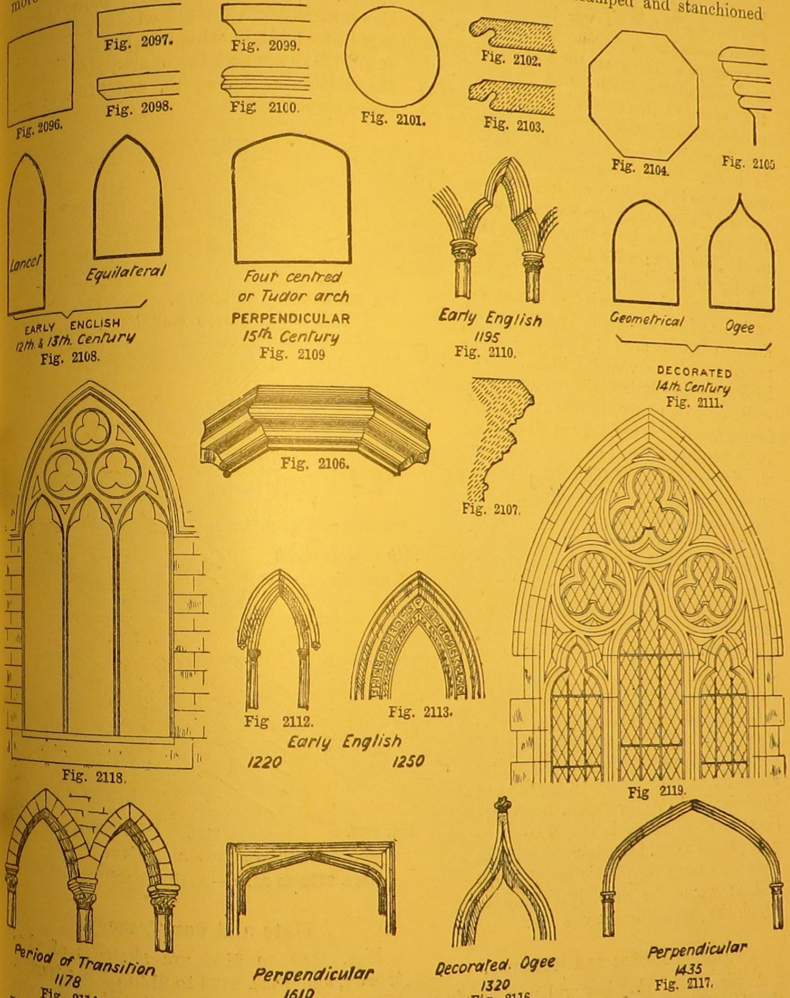
Figs. 2085 to 2087.—Thirteenth-century Mouldings.

Development of the Abacus.

The Norman abacus was always square in plan (Fig. 2096). At first a plain rectangular block with the lower angles square in section (Fig. 2097), then with the lower edges chamfered (Fig. 2098), and the chamfer hollowed out as Fig. 2099, and finally rounded on top and hollowed below with a groove and fillet between, as Fig. 2100. The Early English abacus was circular in plan (Fig. 2101), and consisted at first of two round projecting mouldings with a deep hollow between, the upper roll being the larger, as Fig. 2102. Later in the period the mouldings were more numerous, and frequently with flat fillets on the face, as Fig. 2103. In the Decorated style the abacus was sometimes circular, but often octagonal in plan (Fig. 2104). When circular, the abacus simply formed the upper members of a series of mouldings, constituting the capital of the column, and the mouldings were all of the plain roll order (Fig. 2105), but less undercut than formerly, the scroll moulding being common. In the Perpendicular period the octagonal abacus was used, with moulded edges, as Fig. 2106; but in other cases, where circular, the abacus was not distinguishable from the mouldings of the capital of the column (see Fig. 2107). When the piers were clustered the capitals coalesced, and the mouldings ran continuously round the pier.



Figs. 2088 to 2091.—Thirteenth-century Mouldings.
Figs. 2092 to 2095.—Fifteenth-century Mouldings.



Figs. 2096 to 2100.—Development of Norman Abacus. Figs. 2101 to 2107.—Development of English Abacus.
Figs. 2108 to 2117.—Development of Pointed Arch in England. Figs. 2118 and 2119.—Gothic Windows.

Gothic Architecture.

The term Gothic was not used until the types had fallen into disuse, and was then introduced to signify barbarian (as Rome was overrun by the Goths and Vandals); and students of Classic architecture saw little beauty in pointed arches; but Ruskin did more than anyone else to rescue the spirit of Gothic architecture from oblivion by his powerful writing. In one paragraph he says: "The Gothic architecture arose in massy and mountainous strength; block heaved upon block by the monk's enthusiasm and the soldier's force, and cramped and stanchioned into such weight of grisly wall as might bury the anchoret in darkness and beat back the utmost storm of battle, suffering but by the same narrow croslet the passing of the sunbeam or of the arrow. Gradually, as that monkish enthusiasm became more thoughtful, and as the sound of war became more and more intermittent, beyond the gates of the convent or of the keep, the stony pillar grew slender and the vaulted roof grew light, till they wreathed themselves into the semblance of the summer weeds at their fairest, and of the dead fieldflowers long trodden down in blood. Sweet monumental statues were set to bloom for ever beneath the porch of the temple or the canopy of the tomb." And later summarising the matter, he says: "We have seen that exactly in the degree in which Greek and Roman architecture is lifeless, unprofitable, and un-Christian, in that same degree our own ancient Gothic is animated, serviceable, and faithful. We have seen that it is flexible to all duty, enduring to all time, instructive to all hearts, honourable and holy in all offices. It is capable alike of all loveliness and all dignity; fit alike for cottage porch or castle gateway; in domestic service familiar, in religious sublime, simple and playful so that childhood may read it; yet clothed with a power that can awe the mightiest and exalt the loftiest of human spirits; an architecture that kindles every faculty in its workman, and addresses every emotion in its beholder; which, with every stone that is laid on its solemn walls, raises some human heart a step nearer heaven, and which from its birth has been incorporated with the existence, and in all its forms is, symbolical of the faith of Christianity." Welby Pugin, Sir Gilbert Scott, and other architects who have now passed away, helped considerably to foster the taste for Gothic architecture, and it would be difficult to say to whom the greatest credit was due.

Gothic Arches and Windows.

A number of sketches will now be given showing the progressive changes through which the pointed arch passed, from the rise to the fall of Gothic architecture in England (see Figs. 2108 to 2117). The pointed arch is said to have arisen from a constructional necessity, owing to the tendency of large semicircular arches to sink at the crown by the spreading of the abutments; for example, Furness Abbey. Figs. 2118 and 2119 show alternative designs for a Gothic window, the upper part being filled in with trefoil tracery. Figs. 2120 to 2129 are sketches of arch mouldings of the thirteenth, fourteenth, and fifteenth centuries respectively.

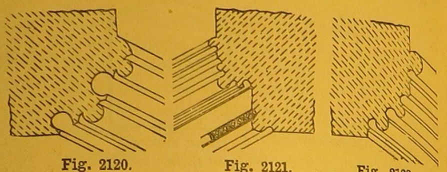


Fig. 2120. Fig. 2121. Fig. 2122.

13th century arch mouldings.

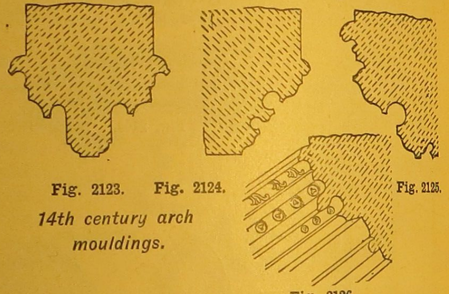


Fig. 2123. Fig. 2124. Fig. 2125. Fig. 2126.

14th century arch mouldings.

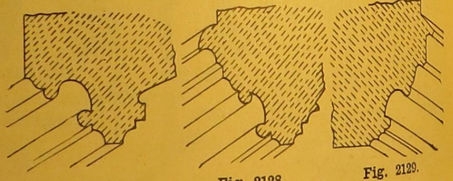


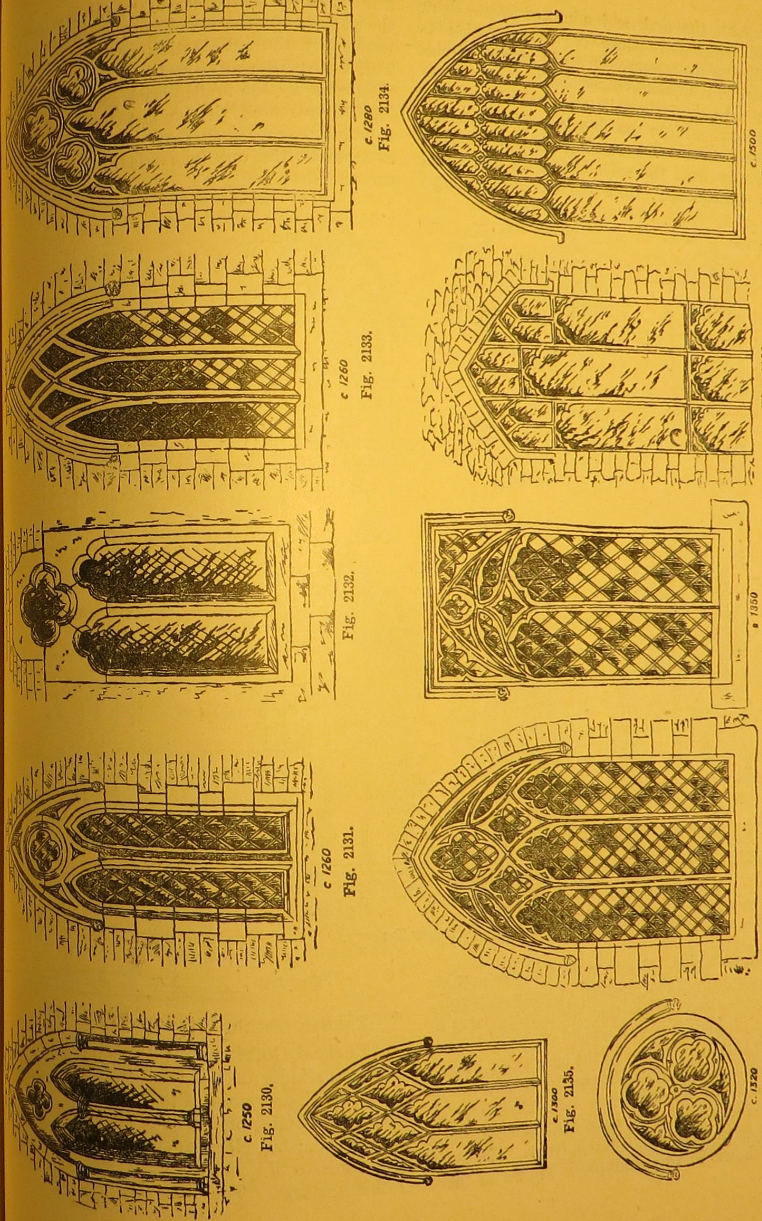
Fig. 2127. Fig. 2128. Fig. 2129.

15th century arch mouldings.

Figs. 2120 to 2129.—Arch Mouldings.

Plate and Bar Tracery.

Figs. 2130 to 2132 are sketches of plate tracery, and Figs. 2133 to 2140 of bar tracery. When two lights were gathered under one dripstone, a blank space, known as the tympanum, was left; but in process of time this space began to be pierced with another small light, in the form of an ellipse, a circle, or a trefoil, which at once relieved the blank space



c 1280 Fig. 2134.

c 1500 Fig. 2140.

c 1260 Fig. 2133.

Fig. 2139.

Fig. 2132.

c 1350 Fig. 2138.

c 1260 Fig. 2131.

Fig. 2137.

c 1250 Fig. 2130.

c 1300 Fig. 2135.

c 1320 Fig. 2136

Figs. 2130 to 2132.—Plate Tracery. Figs. 2133 to 2140.—Bar Tracery.

beneath the arch and admitted more light. This elementary stage of ornamentation is called plate tracery. In early cusped circles there is a distinctive peculiarity in the cusping. In these the foils are produced without rising at all into the chamfer. This style has been called soffit cusping, because it rises directly from the soffit of the arch, and not, as subsequently, from the chamfer or slope of the arch side. Another marked peculiarity in early foils is that, instead of being segments of intersecting circles, they are formed from a series of distinct circles which all cut a larger circle within. Tracery in the cusping of which any of these peculiarities occur is invariably of an Early English when not actually of a Transitional character, as in the example (Fig 2134) from Meopham Church, Kent. The system shown in this example is known as bar tracery, in contradistinction to plate tracery, the patterns of the openings appearing to be formed by the intersection of various bars. This latter form arose naturally enough from the former by the multiplication of the piercings or apertures, till at last the plate disappeared, except such parts as were required to separate the openings and to connect the various parts.

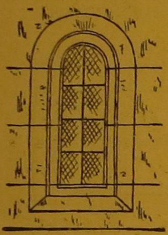


Fig. 2141.

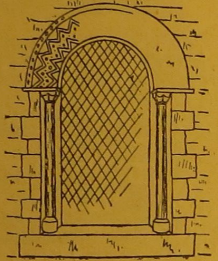


Fig. 2142.

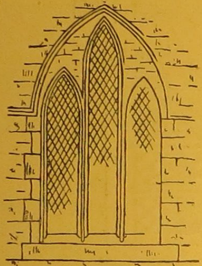


Fig. 2143.

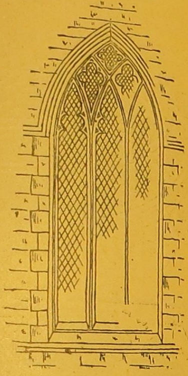


Fig. 2144.

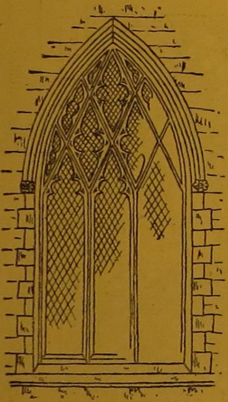


Fig. 2145.

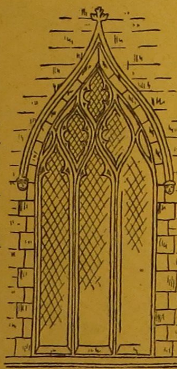


Fig. 2146.

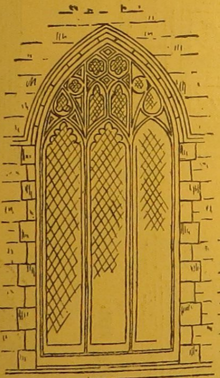


Fig. 2147.

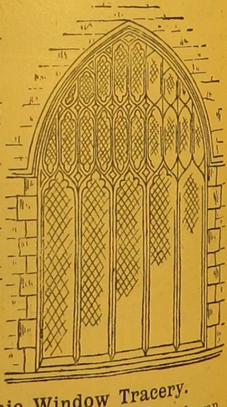


Fig. 2148.

Figs. 2141 to 2148.—Development of Window Tracery.

English Gothic Window Tracery.

In England, Gothic architecture proper began about the middle of the twelfth century, and was called Transitional, as pointed arches were used with details of Norman mouldings and enrichments; but Norman characteristics soon gave place to the more refined and slender Gothic features. The first definite type of Gothic, as seen in the windows of the latter part of this century, took the form of long narrow openings, with pointed arched tops which very much resembled the lancet, hence the title lancet windows. Later, these windows were grouped, as in York Minster. In course of time these groups were enclosed under one arch, and the spandrils and head filled in with plate tracery—merely piercings to relieve the monotony of the flat surface. This tracery afterwards became moulded to resemble bent stone, and so obtained the name of bar tracery.

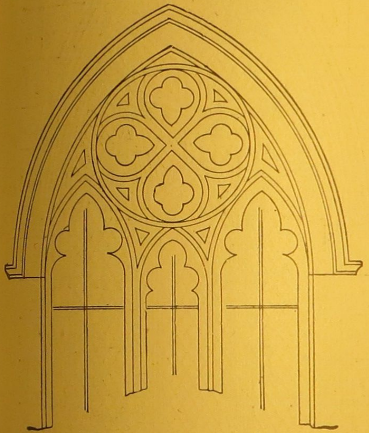


Fig. 2149.—Decorated Window.

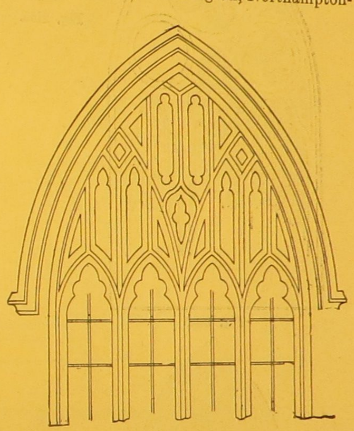


Fig. 2151.—Perpendicular Window.

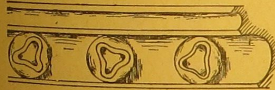


Fig. 2150.—Ball-flower Ornament.

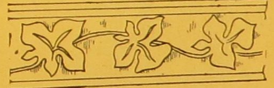


Fig. 2152.—Running Foliage Ornament

The Early English style maintained its position for a long time, until the fourteenth century, when what is termed Decorated came into vogue, so called from the very elaborate arrangement which the traceries of the windows assumed, and the more ornamental character of the general details. This style lasted for about seventy years, and then a striking change took place. Straight lines were introduced into the traceries instead of graceful flowing lines, and the appearance assumed a severer aspect. The windows were lofty, divided by transoms, and the mullions ran through into the arch stones. The heads of the windows were flatter, and in some cases even square-headed windows are found. At the conclusion of this period, which dates about 1480, the Tudor or four-centred arches prevailed. The transoms of the windows were sometimes battlemented. As an example of Perpendicular (Tudor period), Henry VII.'s chapel at Westminster is typical. See Figs. 2141 to 2148 for a series of windows illustrating the development of tracery:—Fig. 2141, Handborough, Oxon., *c.* 1120; Fig. 2142, St. John, Devizes, *c.* 1160; Fig. 2143, Warmington, Northamptonshire, *c.* 1230; Fig. 2144, Dorchester, Oxfordshire, *c.* 1275; Fig. 2145, Stanton St. John, Oxon., *c.* 1320; Fig. 2146, Higham Ferrers, Northants, *c.* 1360; Fig. 2147, Merton College Chapel, Oxford, *c.* 1424; Fig. 2148, Swinbrook, Oxfordshire, *c.* 1500. Fig. 2149 shows a Decorated window in the earlier portion of the period, and Fig. 2150 the ball-flower ornament peculiar to the period. Fig. 2151 shows a Perpendicular window, and Fig. 2152 a running foliage ornament of the same period.

Geometrical Windows.

The Geometrical style, also known as Early

English, comprises mullioned windows with the upper part formed of an equilateral arch and filled with tracery composed chiefly of cusped circles, but invariably of rigid and symmetrical compass curves as in Figs. 2153 and 2154, both of which represent a window in Meopham Church, Kent, date about 1280. Fig. 2155 shows to a larger scale the cusping in the head. Following the tendency of the time, the windows became higher, and were filled with more delicate tracery, having ogee or flowing curves and being surrounded by more delicate mouldings, as in Fig. 2156. In the extreme Decorated style, the tracery became flame-like or flamboyant when the limit of ornamentation was arrived at. "In the triforium arcades of buildings erected in the Romanesque style of architecture (from 1000 to 1145 A.D.), two arched openings are often found, having a large semicircular arch enclosing them. The tympanum or spandril between them is invariably enriched by sinkings or piercings of various kinds. As the time went on, windows were treated in a similar manner.

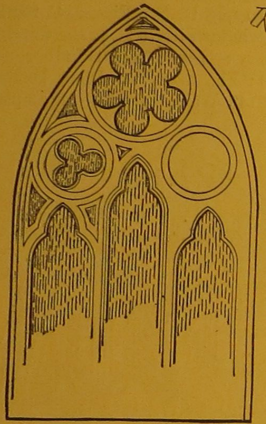


Fig. 2153.

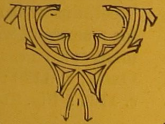


Fig. 2155.

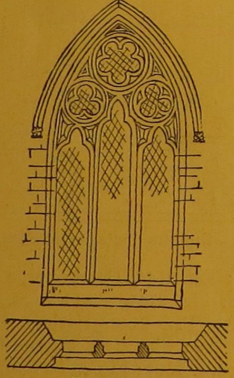


Fig. 2154.

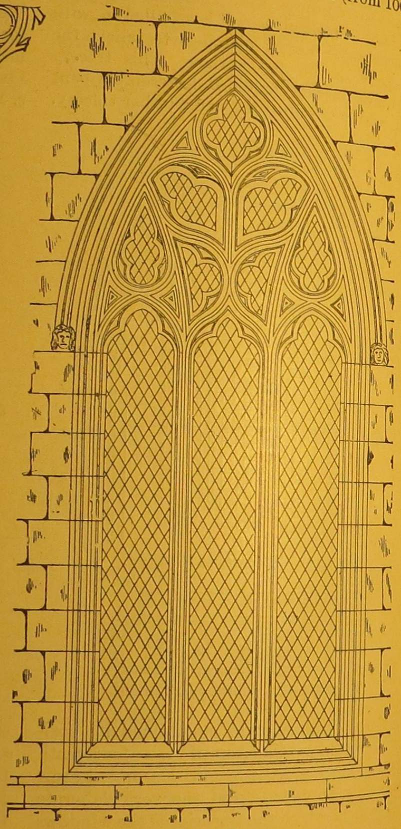


Fig. 2156.

Figs. 2153 to 2155.—Three-light Window in Geometrical Style. Fig. 2156.—Three-light Window in Decorated Style.

and it is then that we have the origin of tracery; such perforations are known as plate tracery, this being developed to a great extent during the earlier part of the Early English periods (1189 to 1220 A.D. being the approximate dates). In the latter part of this style the smaller spandrils of the space between the arches were filled in with geometrical designs, and the perforations followed the line of the various arches and gave to the stonework the appearance of having been bent into shape. This is the earliest form of bar tracery, and was mainly composed of circles, or parts of circles, intersecting one another. The windows belonging to this period are divided into a series of lights of compartments by mullions, often with columns attached. The most intricate design that was adopted could be easily drawn with the aid of compasses, the best result being therefore somewhat stiff and

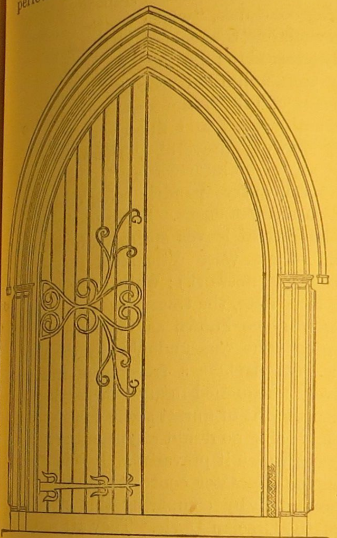


Fig. 2157.

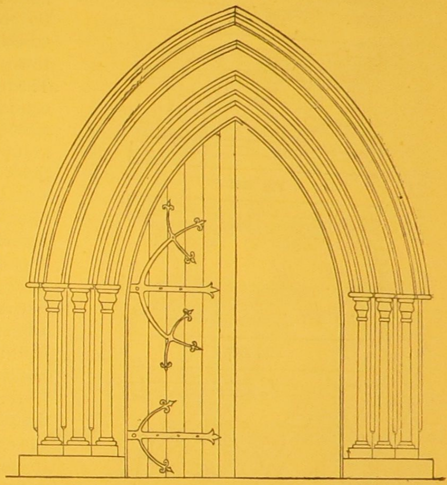


Fig. 2162.

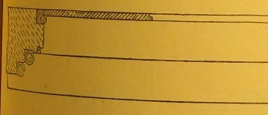


Fig. 2158.

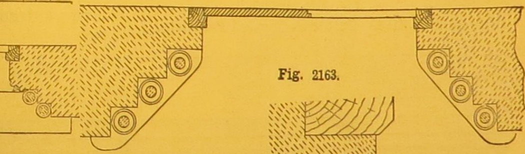


Fig. 2163.

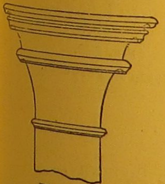


Fig. 2159.

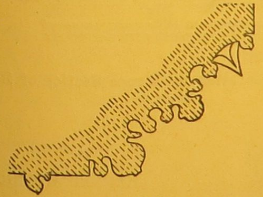


Fig. 2160.

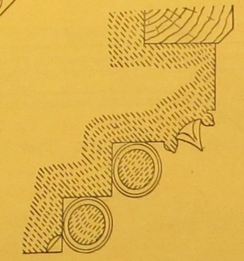


Fig. 2161.

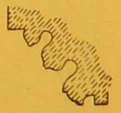


Fig. 2164.

Figs. 2157 to 2164.—English Gothic Doorways and Details.

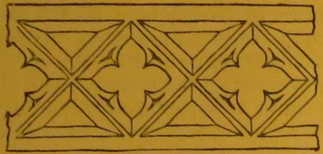


Fig. 2165.

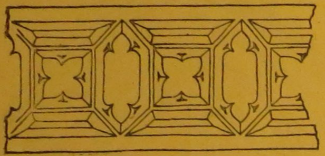


Fig. 2166.

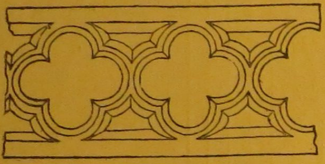


Fig. 2167.

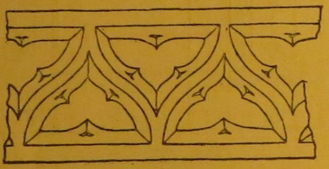


Fig. 2168.

Figs. 2165 to 2168.—Gothic Perforated Parapets.

formal, but for the beautifying effect of the quatrefoils and cinquefoils within the geometrical figures."

Decorated or Curvilinear Windows.

"In the Decorated or Curvilinear style," our authority continues, "which was the outcome of the previous one, the geometrical figures were not strictly adhered to; flowing lines were adopted, thus giving unlimited scope to the designer. The heads of the windows were almost always equilateral arched and filled with a maze of tracery flowing gracefully, there being no abrupt angles or intersections." Cusping was freely used, every spandril being ornamented with two or more cusps. Some of the tracery took the form of leaves springing from a main branch, others were reticulated (having the appearance of network); while in France, at a rather later date, the tracery assumed a flame-like appearance known as Flamboyant. The Decorated style was undoubtedly the perfect Gothic. It displays a freedom of treatment positively unequalled in any other style of the Gothic; a spirit of unrest seems to pervade the design, it being no doubt a type of the spirit of the age in which it prevailed. It is impossible to imagine a greater contrast than that which is represented by comparing this style with that of the Grecian Doric. They are certainly the two extremes of architecture.

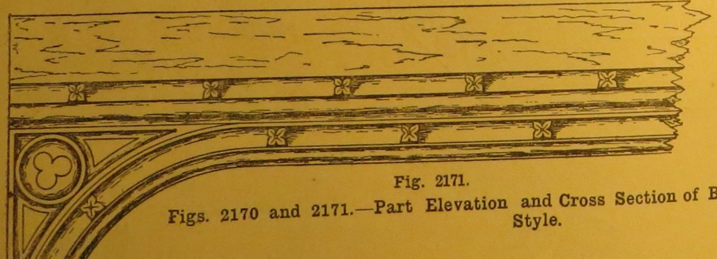


Fig. 2171.

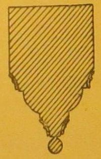


Fig. 2170.

Figs. 2170 and 2171.—Part Elevation and Cross Section of Beam in Perpendicular Style.

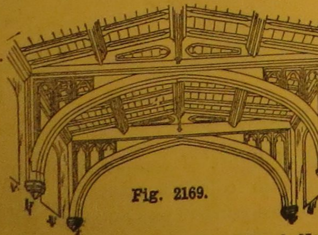


Fig. 2169.

Fig. 2169 --Roof over Church Nave.

English Gothic Doorway.

Figs. 2157 to 2161 show elevation, cross-section, and details of a doorway, 6 ft. wide, of the Early English Period of Gothic, with shafted and moulded jambs, and moulded arch, in stonework. The oak doors and frame are also shown. Alternative sketches are presented by Figs. 2162 to 2164.

Gothic Perforated Parapets.

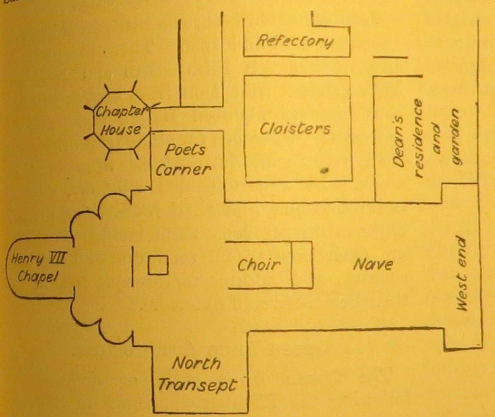
Figs. 2165 to 2168, which are adapted from R. S. Burn's "Architectural Drawing Book," show Gothic perforated parapets.

Examples of the Perpendicular Style.

Fig. 2169 shows the roof over the nave of Ridlington Church, Oxon., date about 1450. Fig. 2170 represents the part elevation, and Fig. 2171 the section, of a beam, moulded and enriched, belonging to the Perpendicular style.

Architectural Styles in Westminster Abbey.

Regarding the positions of the different styles of architecture in Westminster Abbey, Saxon and Early Norman are found in the refectory and parts adjoining; Early English (1216 to 1272), the major part of the chapter-house, part of the cloisters, and the east end of the Abbey, including north and south transepts; later Early English (1272 to 1307), the choir and adjoining parts of nave and cloisters; Early Perpendicular, but in thirteenth-century style (1362 to 1500), the west end of nave and west front of Abbey; Late Perpendicular, Henry VII. Chapel. The western towers, by Sir C. Wren and Hawksmoor, 1772 to 1740. North transept refaced by Sir Gilbert Scott, 1880 to 1892. Fig. 2172 shows a sketch-plan of Westminster Abbey, indicating the various parts referred to above. Between Henry VII.'s Chapel and the choir is Edward the Confessor's Chapel.



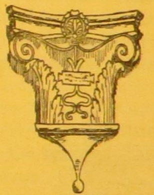


Fig. 2173.

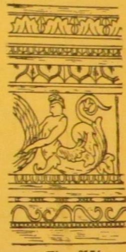


Fig. 2174.

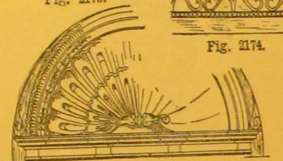


Fig. 2175.

Fig. 2172.—Sketch Plan of Westminster Abbey. Fig. 2173.—Tailpiece. Fig. 2174.—Part of Frieze. Fig. 2175.—Italian Renaissance Shell Ornament.

Renaissance Style.

The Renaissance style of architecture was the result of the revival of classic literature at the beginning of the fifteenth century. It originated in Italy, and its degeneration had already set in before it spread to England at the beginning of the sixteenth century. It came then through the Dutch, and formed a transitional style known as Elizabethan; but Inigo Jones, early in the seventeenth century, introduced a purer style, founded upon the best Italian models, and this was continued by Wren, although with greater freedom of treatment. It continued in vogue until about 1850, when a Gothic revival took place; which, again, gave way towards the close of the century in favour of a free Renaissance treatment. The leading features of Elizabethan Renaissance distinguishing it from English Mediæval are: Elevations symmetrical on either side of a central line. Broad terraces with balustrades. Windows square, very large and high, divided by mullions and transoms, and placed in long rows to form the leading feature of each storey. Oriel windows. Gables with scroll outline. Balustered skyline above a main cornice. Pierced parapets absent. Roofs high-pitched or low-pitched, frequently domed. Ogee-topped lanterns. Ornamental plastered ceilings, coffered, barrel, or flat. Entrances with pediments and pilasters. Ball finials numerous. Arches semicircular or elliptical. Ionic and Corinthian capitals to columns and pilasters. Sculpture used as an accessory.

Renaissance Mouldings and Ornament.

Fig. 2173 is a sketch of a tailpiece from a doorway of Santa Maria, Venice, A.D. 1632; Fig. 2174, a frieze from Lodi, Italy; Fig. 2175, an example of the Italian Renaissance shell ornament; and Fig. 2176, an example of French Renaissance, being a capital from the House of Francis I. at Orleans, A.D. 1540.

Elizabethan Architecture.

Elizabethan (1558-1603) is a transition style between the Tudor or Late Gothic and the revived Classic architecture, and was transmitted through the Dutch. It was applied chiefly to large country houses or mansions, and to some of the colleges at Oxford and Cambridge. It is not a church style. Its chief characteristics of planning are: (1) Symmetrical arrangement on each side of a central line. (2) The great hall, a survival of the ancient style of domestic building from the time when the hall was the only apartment. The importance of the hall was gradually diminished by the addition of more and more private rooms for the family, and of offices, etc. The walls were lined to a height of 8 ft. or 10 ft. with oak panelling, and trophies of the chase, tapestry, heirlooms, relics, etc., were arranged on the space above. (3) The broad staircase of oak, with heavily carved newels, pierced balustrading, and rich carving. (4) The great gallery on the first floor, extending the whole length of the house, relieved by large projecting bays, containing windows in oak to their full height, and the ceilings richly modelled in plaster. Its chief characteristics of detail were: Gables scroll-shaped and terminated with ball finials; balustered parapet above the main cornice; roofs fairly high-pitched; smaller parts domed or ogee-shaped; windows very large, mostly square, with mullions and transoms, and filled with lead-lights containing coats of arms; walls of the principal room panelled in oak to their full height, and the ceilings richly modelled in plaster.

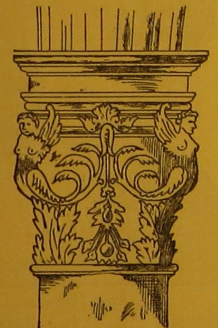


Fig. 2176.—Capital, French Renaissance.

Jacobean Architecture.

Jacobean architecture had its period between the years 1603 and 1625. There was no break in style between Elizabethan and Jacobean, but a gradual transition from modified Gothic to a more pronounced Italian style, and an increasing preference for stone over brickwork. Many Jacobean farmhouses were built of stone, with square-headed windows, stepped or scroll gables, and tiled roofs, being a great advance on previous farm residences. They are even now to be seen dotted about the country, and adding picturesque charm by their lichen-covered exteriors.

Queen Anne Architecture.

The Queen Anne style of architecture, following the Elizabethan, came to England through the Dutch, being introduced by King William III. at the beginning of the eighteenth century, and developed during the reign of Queen Anne. It was based on the Gothic styles which had preceded, but was largely imbued with the Classic Renaissance, particularly in some of its details. They are mostly solid rectangular buildings in plan. The usual material for the walls is red brickwork, with pilasters, cornices, panels of carved ornamentation, and other decorative features, such as aprons under the window-sills, executed in cut bricks, showing many fine examples of workmanship. For arches, niches, and window heads, very finely jointed brickwork was used. The wall was generally finished by a crowning cornice of considerable projection under a high-pitched roof with hipped ends. The roofs were steep and of considerable area in one plane, sometimes with prominent picturesque dormers, high brick chimneys, and lofty gables. The brickwork of the gable-end was sometimes broken up into steps, ramps, curves, and scrolls, terminating with ball finials at the eaves, as in Elizabethan work, surmounted by a pediment at the apex. The joiners' work is an important feature of the style; it is heavy and massive, and lends considerable charm to the structure. The windows are rectangular, and arranged with sashes, the sash bars being very thick, and the whole space divided into small square panels. The frames and bars are usually painted white, but sometimes a light or dark sage green; the white, however, being the most effective. The doors are heavily moulded, and are frequently surmounted by pediments carried on carved brackets or pilasters. The woodwork of the staircases is very bold and effective, the newel posts and balusters being massive, and ornamented chiefly with turned mouldings, the handrail large and the staircase wide, to match the proportions of the other parts. It is a very popular style among architects of the present day, principally from the impetus given by the designs of Norman Shaw, Ernest George and Peto, and Robson of Board School celebrity.

Scottish Baronial Style of Architecture.

The Scottish Baronial style of architecture resembles that of the Renaissance châteaux of France, and the Scottish noblemen seem even to have employed French architects. The style may be said to have been in vogue from the beginning of the sixteenth to the end of the seventeenth century. Corner turrets corbelled out from the upper floors were very characteristic of the style. In this, as in all Scottish architecture, the gables had stepped outlines. This was originally from rude workmanship, but was afterwards a distinctive feature called "crow stones." There were as a rule few windows near the ground, the upper rooms being used as the chief apartments, but these castles were not built as fortresses. Although the battlements were retained, it was only as ornament, and the corner turrets were generally useless for defending the walls, as the window was situated at the external angle. The absence of openings near the base gave a pleasing effect of solidity and strength, "which is characteristic of the people and their national disposition." In some examples, the turrets are covered with high-pitched conical roofs; in others, the roofs were kept out of sight and the tops castellated. The details are as a rule Classic, but are treated with considerable freedom. Newark Castle, near Selkirk, is a fairly good example of the style. Another description: The castles and semi-fortified houses of Scotland form a group apart, possessing strongly marked and well-defined character. They are designed in a mixed style, in which the Gothic elements predominated over the Classic ones; but the Scottish domestic Gothic, from which the new style was partly derived, had borne little or no resemblance to the florid Tudor of England. It was the severe and simple architecture of strongholds built with stubborn materials, and on rocky sites where there was little inducement to indulge in decoration. Dunstaffnage Castle and Kilchiern Castle may be referred to as examples of these plain, gloomy keeps, with their stepped gables, small loops for windows, and sometimes angle turrets. The Classic elements of this style were not drawn direct from Italy, but came from France. The Scots, during their long struggles with the English, became intimately allied with the French, and it is not surprising that Scottish Baronial architecture should resemble the Early Renaissance of French châteaux very closely. The hardness of the stone in which the Scottish masons wrought forbade their attempting the delicate detail of the François I. ornament; and the difference in the two climates justified in Scotland a boldness which would have appeared exaggerated and extreme in France. Many castles were erected in the sixteenth and following centuries in Scotland, or were enlarged or altered. The most characteristic features in almost all of them are short, round angle turrets, thrown out upon bold corbellings near the upper part of towers and other square masses. These are often capped by pointed roofs; and the corbels that carry them, which are always of a bold, vigorous character, are frequently enriched with a kind of cable ornament that is very distinctive. Towers of circular plan, like bastions, and projecting from the general line of the walls or at the angles, constantly occur. They are frequently crowned by conical roofs, or finished with gables; or